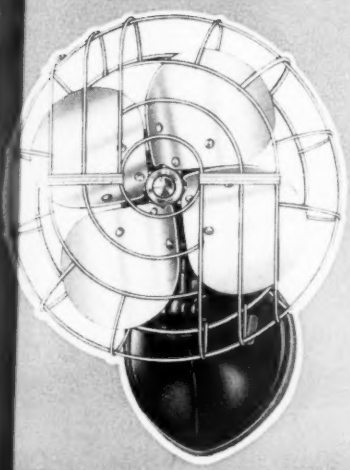
NOVEMBER, 1939

ELECTRICAL SOUTH



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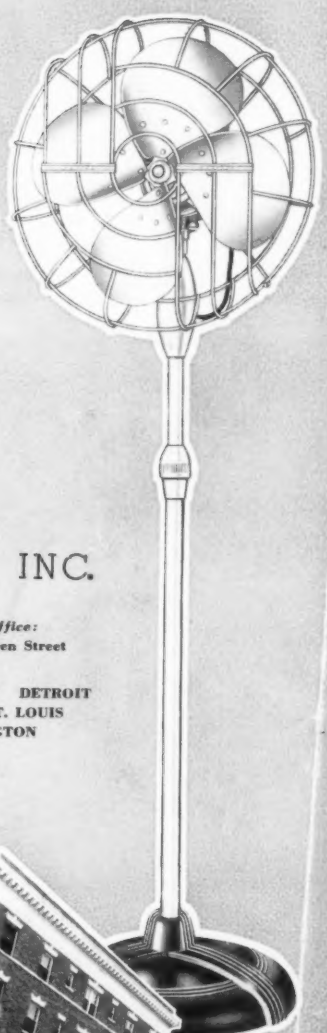

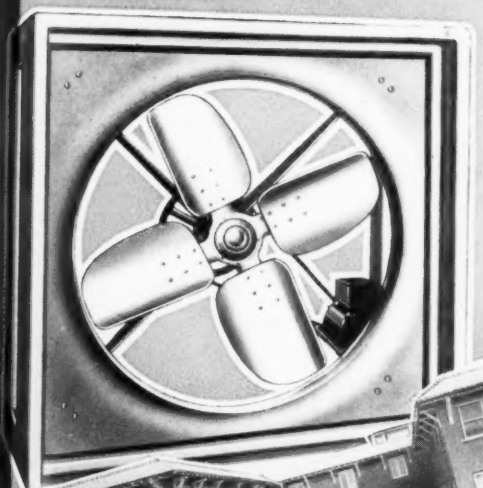

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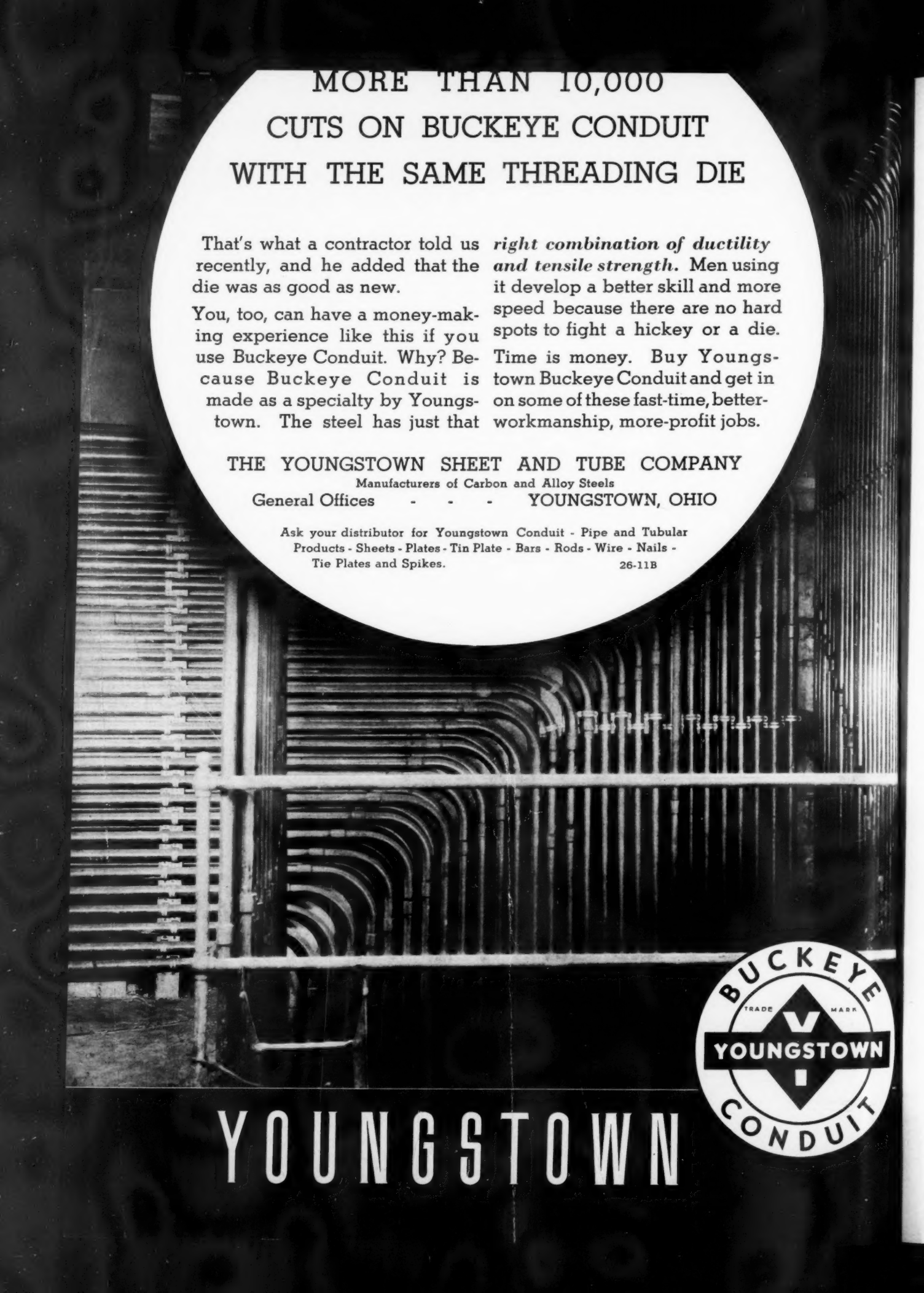

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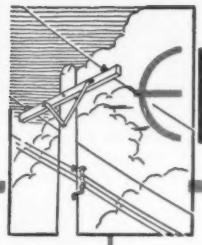
YOUNGSTOWN

NOVEMBER
1939

Volume 19 No. 11



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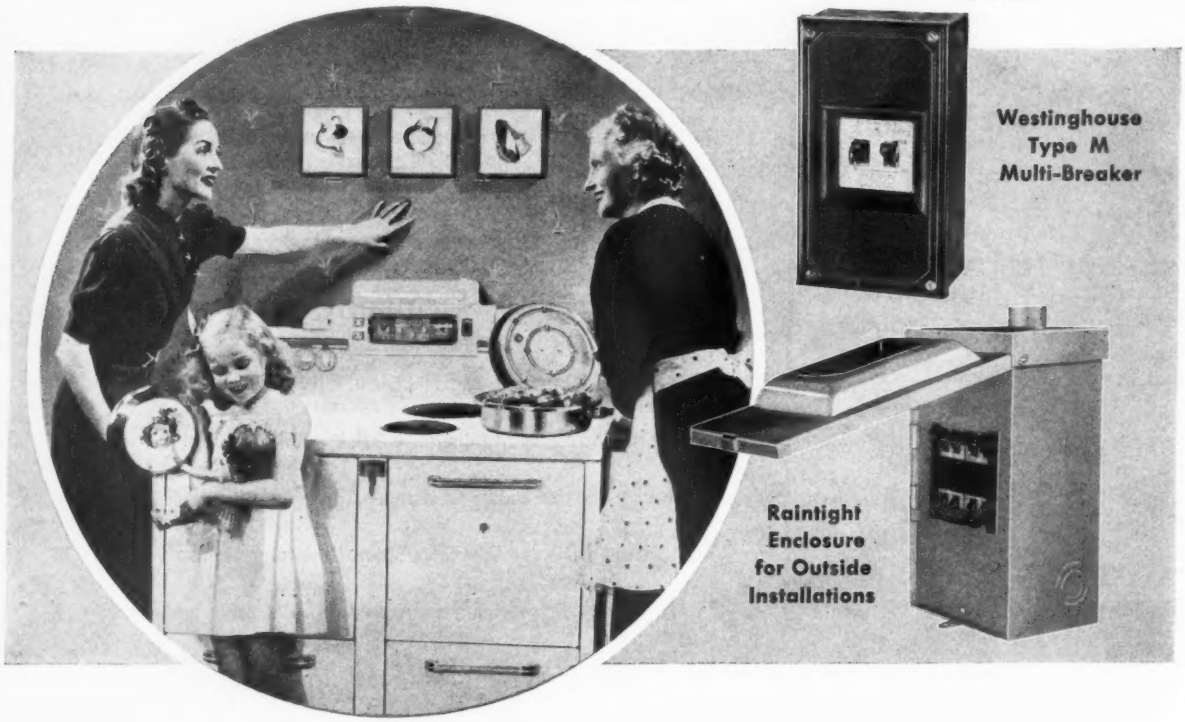
Westinghouse Multi·Breakers



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ELECTRICAL SOUTH

NOVEMBER, 1939

Government Relation to the Electric Utility Industry

A discussion of present trends by the Natural Resources Production Department Committee of the United States Chamber of Commerce.

THE forces of government competition in recent years have borne heavily on the private electric utility industry. This has retarded the progress of this highly important business, the normal development of which makes a large contribution to industrial activity. In many directions, the Chamber has opposed the extension of government into this field of business. There are indications of a betterment of relations between government and the industry, but uncertainty as to policies the government may follow continues in important regions of the country. Your Committee has felt that a statement covering recent developments, noting progress made, and indicating measures that would assume full development of the private electric utility industry would be timely.

Legislative Developments

The past decade witnessed unprecedented federal activity that complicated and altered the usual practice of dealing with public utilities through state regulations. This federal activity commenced with the passage in 1933 of the Muscle Shoals Act which created the Tennessee Valley Authority. This federal agency early established the federal government in a competitive power business on a large regional scale.

In June, 1933, less than a month after the Muscle Shoals Act was passed, Congress passed the National Industrial Recovery Act, which provided for the setting up of the Public Works Administration with power to build federal power projects, aid existing municipal utility enterprises through loans and grants, and give similar financial aid to states, municipalities, districts, local authorities and cooperatives willing to initiate competition with, or supplant existing privately-owned utilities with publicly-owned utilities.

Then followed the Public Utility Act of 1935 that would, to use its own language, "compel the simplification of public utility holding company systems and eliminate therefrom properties detrimental to the proper functioning of such systems."

J. F. Owens, president of the Oklahoma Gas and Electric Company, is chairman of the Natural Resources Production Department Committee of the United States Chamber of Commerce

Figures of Government Activity

Under its present set-up, which includes the purchased private properties, TVA has 324,000 customers, a total installed generator capacity of 665,000 kw., about 100,000 kw. of which is steam generating capacity, and an output of 2,310,000,000 kw. hrs. (1938 figure). The transmission network of the combined systems, having a voltage of 22,000 volts or over, consists of some 3,700 miles of transmission lines. About fifty communities exclusive of cooperatives formerly serviced by private companies are now receiving their energy from the TVA. Only ten private systems had as great an output in 1938, while eleven systems had as great a generation rating. The combined capacity of the purchased property and the dams under construction will be well over 2.000,000 kw., a generator rating for one system exceeded only by the Consolidated Edison Company of New York.

Public Works Projects financed in whole or in part by the Public Works Administration to date include 14 federal power projects with an ultimate installed capacity

of 5,000,000 kw. Financial aid has been extended to 14 state projects with an ultimate capacity of over 600,000 kw., and to 206 existing municipal plants and 113 new competitive municipal plants. The kw. capacity involved in the latter type of financial aid is not available. The total cost of this federal power program, which includes the full cost of multi-purpose facilities, is around $2,000,000,000, or one-seventh of the total investment of private electric utilities.

In the face of the federal activity and the federal expenditures just cited it is not surprising that the electric utility business has been fraught with uncertainty. Until within the year, this uncertainty was intensified by the pendency of new legislative proposals threatening further competition and regulation. An example is the proposal before the last Congress to cover the country with seven regional Authorities like the Tennessee Valley Authority. That proposal was vigorously opposed by the Chamber's membership. It was abandoned and has not been revived in the present Congress.

The Legislative Outlook

Very recently the legislative outlook appears to have changed. No flood of anti-utility bills has been introduced for consideration by the present Congress. On the contrary, during the session just closed, two decisive steps were taken in the direction of restricting power activities of the federal government. One of these placed limitations upon the powers of TVA to expand at will its competition with private utilities. The other resulted from amendments agreed upon in the Works Financing Act as it passed the Senate, prohibiting the use of federal funds to be made available for municipal projects which would compete with any private-owned public utility, unless there has first been held a public hearing and finding as to the reasonableness of an offer to purchase and its failure of acceptance.

An interesting challenge to the policies that the federal government has been pursuing is the action of the State of Alabama in enacting a law forbidding the construction of municipal electric projects unless and until attempts have been made to purchase at reasonable prices existing privately-owned plants.

Realization of the serious problem of loss of taxes resulting from public ownership has undoubtedly been an important factor in influencing Congressional and public thinking on this subject.

Evidence of Changing Attitude

Outside of Congress, the last year has witnessed evidences of a better attitude by public agencies toward private utilities. The settlement of the TVA controversy with private power companies through purchase has been mentioned already. As early as the Rural Electrification Act of 1936, Congress began settling boundaries of competition. The Secretary of Agriculture, to whom has been transferred the administration of R.E.A., has emphasized as a praiseworthy feature of rural electrification the fact that it does not duplicate and compete with existing private facilities. Arrangements with private power companies for the disposal of power generated by the Lower Colorado River Authority of Texas, received the President's commendation in the following words,— "I was glad to receive your letter telling of the progress of the Lower Colorado River Authority. It shows that it is possible for a neighboring private utility to cooperate with a public power development to the advantage of both, and the public. I hope that this cooperation will be manifested in other areas where similar problems exist."

Cooperative Relationships vs. Government Competition

A cooperative arrangement whereby the federal government would sell its hydro-electric power to privately-owned utilities for distribution is not a new idea, for, in September 1932, President Roosevelt said, at Portland, Oregon,— "State-owned or federal-owned power sites can and should properly be developed by government itself. When so developed, private capital should be given the first opportunity to transmit and distribute power on the basis of the best service and the lowest rates to give a reasonable profit only."

Recent evidences of the willingness of the Administration to apply this cooperative idea are gratifying, for there still remain privately-owned distributing systems in extensive areas of the country where the question of how the electric power generated at federally owned hydro-electric plants will be distributed must be determined.

The wastefulness of government duplication in privately-owned distribution facilities is universally recognized. The issue, therefore, is whether the government should take the distribution in its own hands by purchasing existing privately-owned facilities or permit the existing private utilities to do the distributing by selling them the power.

Membership's Viewpoint

The declared view of the Chamber's membership is that "when electric energy is generated by public agencies in connection with public works for flood control, improvement of navigation, reclamation of arid lands, or similar purposes, power should be recognized as produced in a multi-purpose project, and a central regulatory agency, such as the Federal Power Commission, should be given the duty to arrange a cooperative procedure for transmission and distribution of such power that will prevent destructive competition with existing private enterprises and give due weight to the service that should accrue to the public by reason of regional advantages."

Conclusions

Development of cooperative relationships whereby private utilities are given opportunity to distribute power generated at government hydro-electric dams should be encouraged. It is an economically sound principle as contrasted with the wastefulness of government duplication of existing privately-owned facilities.

Development of this principle would also do much to remove the threat of government competition that has held back needed growth in the private utility industry.

While continuing its efforts to secure application of the above principle, the Chamber should omit no opportunity to show the fallacies of the so-called "yardstick" method of measuring the cost of generation and distribution of electricity, and the extent to which the alleged advantage of government power, viz., cheapness, is the result of unseen subsidies and a shifting of benefits and burdens among different groups of citizens.

For More Christmas Sales

Gift Aisle Popular Sales Stimulant

TO get all his gift items concentrated at one point in the store, where customers could walk along and quickly decide on Christmas gift purchases, one electrical merchandiser created a gift aisle, with tables and platforms as island displays to make them stand out. Then he mounted electric spotlights on the ceiling, projecting different colored lights on the gift tables to make them stand out and catch the eye.

Along this aisle were separate displays of electric clocks, electric heaters, heating pads, room humidifiers, waffle irons, grills, percolator sets, table lamps, toasters, hot plates, hair dressers and dryers, mixers, etc.

At both ends of the aisle, which ran the entire length of the store, were illuminated Christmas trees, with decorations on the pillars, and a platform spot at each pillar. He kept shifting around merchandise on these display tables and platforms to catch the eye and make sales.

Each week he went through his stock and selected something he thought might sell in quantity and gave it a trial. Thus he found out which were the best sellers. The main idea of this gift aisle was to keep changing the arrangement, so that new items would appear up front to attract attention and prick the buying urge.

The gift aisle attracted much attention, and sales jumped immediately in many lines. By finding out which were the best sellers, this electrical merchandiser was able to set up a permanent display of best sellers during the final two weeks before Christmas; items that had spot appeal and caught the eye of the casual shopper, looking for an appropriate Xmas gift, and concentrated their minds on that.

The gift aisle was started right after Thanksgiving and displays changed weekly. It was one of the most successful years for merchandising electrical appliances as Christmas gifts that the store had enjoyed for sometime.

●

"Hospitality House" Christmas Campaign

CHRISTMAS sales of small appliances were stepped up above all past records in a "Hospitality House" campaign conducted in 1938 by the Mississippi Power & Light Company.

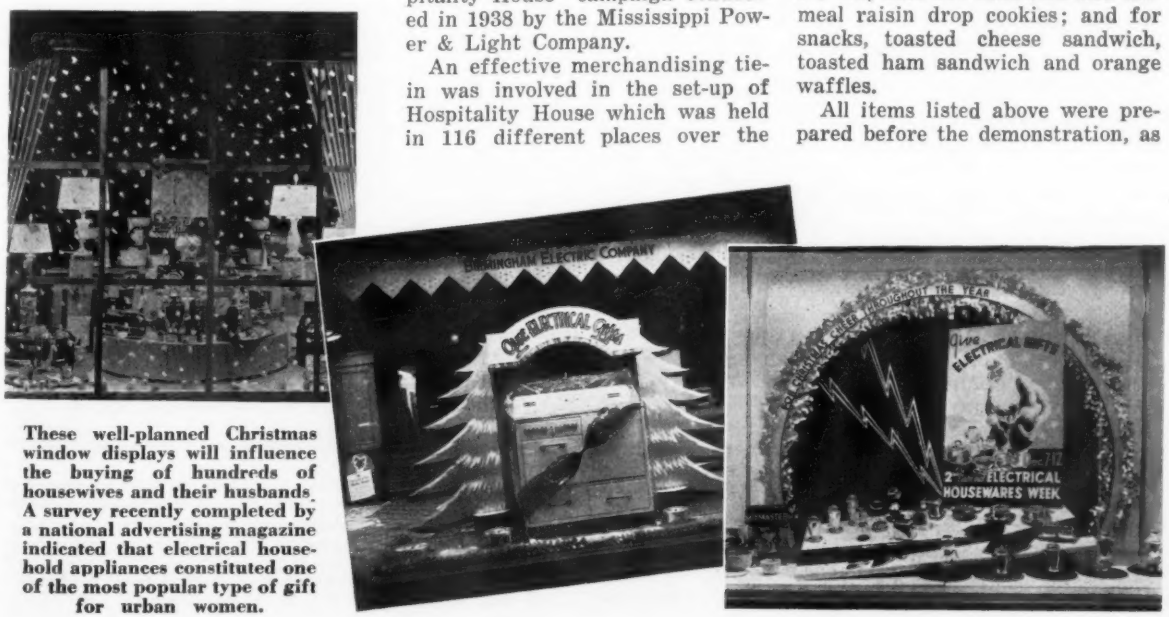
An effective merchandising tie-in was involved in the set-up of Hospitality House which was held in 116 different places over the state with a total attendance of 5,183 according to Miss Dannie May Izard, home service director. The promotion was under the direct charge of L. M. Taylor, then residential sales manager, now sales promotion and advertising manager.

Some of the demonstrations were held in utility offices and some in dealer show rooms, dealers being encouraged to enter merchandise displays wherever the display was held in utility show rooms.

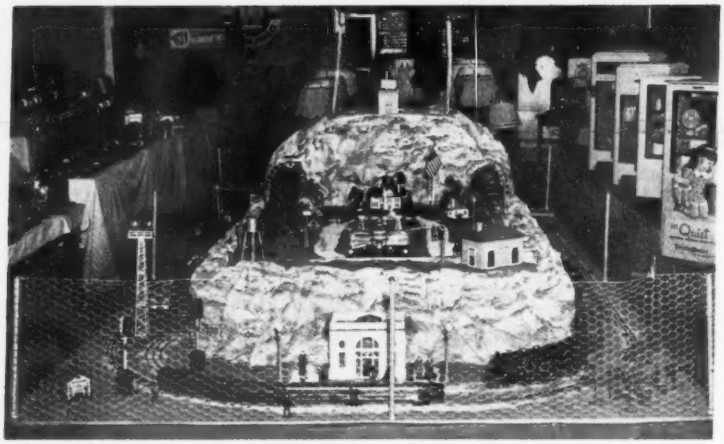
Under the Hospitality House plan, a waffle table was set up at each location together with a table of small appliances, those selling for less than $12 being regarded as most suitable for gifts. Members of women's clubs, including church groups and P. T. A., were invited to come in at an appointed hour for light refreshments.

For the occasion, the waffle demonstration table was decorated in color with sections setup to suggest waffle preparations for each meal as follows: for breakfast, plain waffles, bacon waffle or French toast; for lunch, creamed ham on waffle, spice cakes and corn bread waffle; for dinner, creamed vegetables on waffle toast, chocolate waffle cake and strawberry or peach short cake; for tea, date-nut sandwich and oatmeal raisin drop cookies; and for snacks, toasted cheese sandwich, toasted ham sandwich and orange waffles.

All items listed above were prepared before the demonstration, as



These well-planned Christmas window displays will influence the buying of hundreds of housewives and their husbands. A survey recently completed by a national advertising magazine indicated that electrical household appliances constituted one of the most popular type of gift for urban women.



Zach Rudo Electrical Company, of Baltimore, makes a specialty of electrical trains. Although this line appears to be gaining in popularity during all seasons of the year, it is proving a fast moving line during the Christmas shopping period. The display shown here with four complete trains moving continuously and automatically never fails to bring in large numbers of passersby during the holiday season.

well as coffee in a coffeemaker. When guests arrived, they were served coffee and sections of waffle or date-nut sandwich. The attention of all was directed to the waffle display and the appliance display, and each was given a recipe sheet, listing the waffle dishes on exhibit.

Women guests were asked to fill in a card indicating the appliance they would most like to receive for Christmas, a free drawing being the inspiration for this. Then later, these prospect cards showing preferences were distributed among the dealers.

In addition, the utility wrote a letter to husbands of the women, advising them of what their wives had selected as appliances they would like to own. Needless to say, this service was appreciated by husbands who at the last minute start out to buy something for their wives but who have no idea of what would be most desired. The husbands were advised to select their gifts at any electrical store.

One of the inspirations for the novelty Hospitality House promotion was a survey conducted by Ross Research Corp, for *Sales Management*, in which it was shown that electrical appliances constitute the most popular gifts for urban women. Of the women interviewed, 12.2 per cent expressed a preference for electric appliances, 12.2 per cent for wrist watches, 10.3 for furs and fur coats, and so on down the list. Results of the Mississippi campaign gave additional credence to this survey.

Electric Trains Good Xmas Feature

THE Zach Rudo Electrical Company in Baltimore has been selling electrical trains for thirty years, always doing a nice Christmas business. With the modeling hobby becoming more popular, they find it a year round business now, and quarter scale models sell every month in the year.

They are selling something in the train line almost daily and keep one section of the store devoted to train displays, with stock valued at around $6,000 list. They also repair trains. On display one will find trains from small 027 line to the one-quarter, large scale, worm gear, from $97.50 on down to $7.95.

"It's no longer just a kid's game," says Rudo Melvin. "Elderly people claim to buy them for their grandchildren or nephews and nieces, but they play with them too. The average human being is interested in trains, even the ladies are interested in railroading."

During the months of November and December the store advertises over the radio, with a spot every morning and evening, inviting the public to come in and see "our electrical train garden."

Last Christmas the firm did one of the largest train sales job in the city and state, selling close to $10,000. They have had as many as 400 to 500 people a day come in to see the train garden. Trains are their most popular item at Christmas time. They have practically all models in the manufacturer's catalog on display.

During the holidays, they put up an electrical garden, showing operation of trains automatically, and covering a space of ten by eighteen feet. This attracts large numbers, and many a child says to its father or mother, "We want to go down to Rudo's to see the trains."

The exhibit is constructed of mountain paper with two railroads on one level, one O-guage and the other standard. Other trains operate up in the mountain regions and through tunnels.

Childrens' Theatre Builds Xmas Sales

ALL during the Christmas shopping period the Jenkins Music Co., Tulsa, Okla., who carry an extensive line of radios and major electric appliances, maintained a children's theatre, the only entrance to which was through the store. Motion picture shows, with subjects appropriate for little ones, were given every Saturday night—the store keeping open that evening. There was no admission fee, but as the capacity of the theatre was limited to 200, it was necessary to register in advance. The child himself could not register, it was necessary that an adult register for him, prefer-

This ingenious display presented a wide range of Christmas novelty lights and decorations to the shopping public. The huge candle was studded with miniature lamps, and surrounded with other decorative items.

ably one of the parents. This insured the visit to the store of many people, who thus had an opportunity to note the attractive holiday merchandise stocked.

The weekly ad of the firm contained the suggestion "Bring your children and register for the Children's Theatre during the week: then bring them and leave them there while you do your shopping Saturday night."

Their holiday decorations were put up the first of November. The outside decorations, in particular, attracted city-wide attention. Across the entire front of their marquee was set a row of fir trees. In the midst was erected a miniature church with stained glass windows. This church was lighted at night, making it stand out distinctly for several blocks, and from the belfrey at intervals Christmas carols were broadcast.

Display Windows Move Xmas Items

SO much depends on the manner in which holiday merchandise is presented. The Southwestern Gas and Electric Co., Shreveport, La., had a series of semi-backless windows, with units alternately of major and table electric appliances. Cards of red, lettered in white advised "Shoppers Guide to Practical Gifts;" with a display of lamps "Merry Christmas to all. and to all a good **Light;**" and "Season's Greetings—May Your Gifts Be Electric Ones."

A small window near the entrance showed a refrigerator wrapped in yellow cellophane and tied with broad bands of red cellophane ribbon, with the catchy card "Precious articles are done up in BIG packages nowadays—as anyone will agree who receives this electric refrigerator as a Christmas gift."

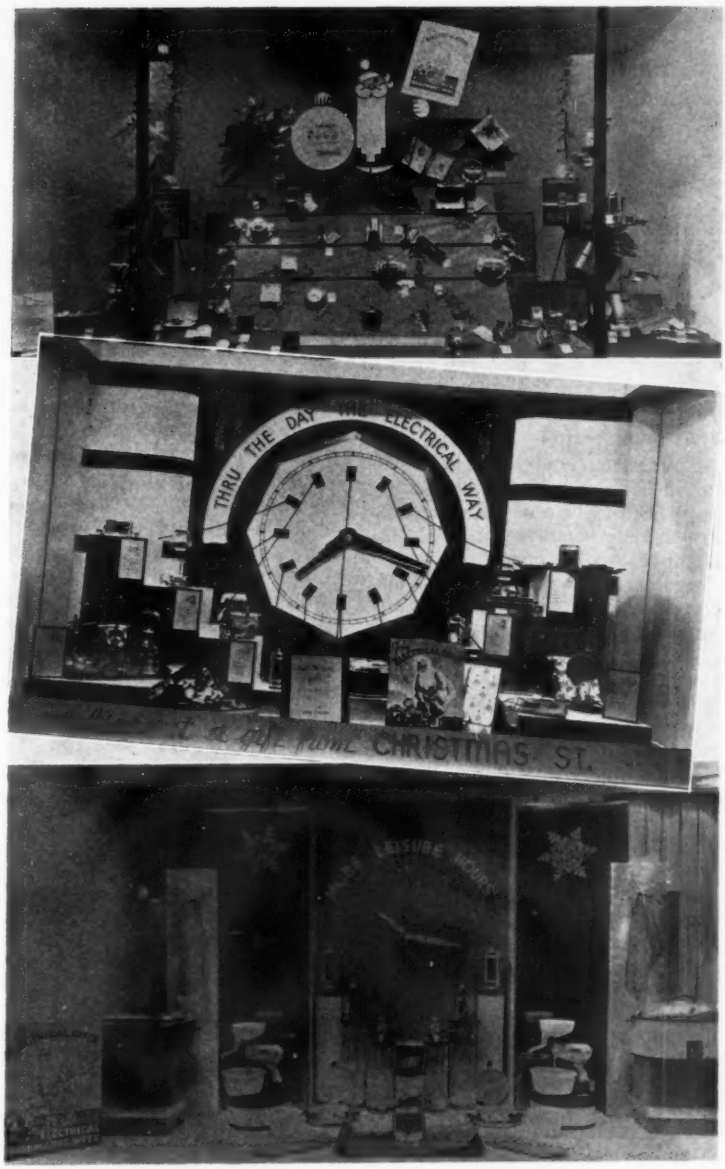
The salesroom was hung with vast quantities of blue and silver tinsel, with clusters of blue foliage and silver bells attached to the pillars.

* * *

VANDEVERS, Tulsa, Okla., attracted wide attention through their series of windows each with a panel representing Christmas celebration in some foreign land. They ran a special ad in the papers calling attention to this series, with a brief description of the scene represented on each panel. In the window devoted to major appliances, they showed a huge box, large enough to contain a refrigerator, washer, ironer or range, tied with broad bands of red ribbon, a number of the actual appliances being shown in front of it.

* * *

ACKLEYS, Birmingham, Ala., who feature the Norge washer and ironer, introduced them to the public as much appreciated Christmas gifts through a pair of windows that fairly shouted "Merry Christmas!" In each was a small stage mounted on a platform. On one was shown a minature team of reindeer (each four inches long), drawing a sleigh, stopping before a snow covered cottage; and in the other a snow covered field, dotted with little trees laden with snow, while in the rear was a little home brightly lighted from within.



Most dealers seem to favor this type of window display for moving Christmas gift items. The large number of items on display carries with it the suggestion that "In this large selection, I will certainly see just the thing for Aunt Mattie."

Twelve-Month Promotion Plan Builds Washer Volume

By Eli Sanditen

Manager, Appliance Department
Oklahoma Tire and Supply Co.
Oklahoma City, Okla.

OUR firm sold 1,500 washing machines in the calendar year of 1938, and in the current year we expect to increase that volume by about 15 per cent, for present indications are that our year-end volume will be at least 1,700 washers.

Several basic changes have been noted by us in the home laundry appliance field and other changes are in the formative stage, but as a general rule there has been no "revolution" in the process of merchandising home laundry appliances.

That, at least, is our experience. Continual hammering with promotion ideas that have proved themselves to be productive of business remains the principal weapon in the hands of the home laundry appliance dealer. That is particularly true of washers. In the ironer field, it is a slightly different story, as will be explained later.

Our volume in washers is produced, principally, through the medium of four vigorous promotions each year, conducted simultaneously in all of our retail outlets, with advertising effort concentrated for the period, and the promotion generally geared to an attractive contest for salesmen.

Each three months we introduce such a promotion and although it is not devoted exclusively to laundry appliances, those appliances receive some major attention.

Two-Color Catalog Used

In the spring and in the fall, our promotion effort gets its greatest impetus from a 24-page, two-color catalog and in the summer and winter the principal impetus is a large, two-color circular.

Three hundred thousand of these catalogs, or circulars, as the case may be, are distributed from door to door in the communities where we have retail outlets. This effort is supported by appropriate newspaper space and by 15-minute daily programs over three strategically located radio stations. The newspaper and radio advertising calls attention to the catalog or circular and otherwise emphasizes especially attractive offerings at the nearest Oklahoma Tire and Supply store.

This review of our promotion method has not been aimless for it now permits me to point out a characteristic of our advertising which we consider instrumental.

We find, for example, that the 300,000 catalogs and circulars are the most effective form of advertising for the cost per unit. In that quantity, the cost of a catalog or circular gets down around the irreducible minimum and either catalog or circular has a much better chance of existence for several days, or even a week, than do other forms of advertising. Newspaper space is dead and gone in a day, and a radio program vanishes even quicker than that from the memory of the listener.

So we know that the catalogs and circulars are largely responsible for our volume in washers, but we also recognize that we cannot depend upon them entirely. Good, attractive newspaper space is essential, and we believe that radio time is easily worth the money, especially at the periods of peak promotions, when the radio permits an urgency appeal.

Premiums Never Fail

As for specific washer promotion, our favorite is an old one. It is well worn from use and it is not what one would consider as being glamorous in appeal. But it has been tried so often and has proved so good that it cannot be discarded in favor of anything more fancy. In fact, we have tried about everything in connection with washer promotion, but we find that giving a case of soap free with every washer has more pull than anything else devised.

Probably the best explanation of the fact that this offer sells wash-

This window display is typical of those used by the Oklahoma Tire and Supply Company. Note the two washers located on the sidewalk where passersby can examine them at close range. Also, note the water heaters included in the display with the idea that every washer machine purchaser needs a ready source of hot water.

ers is the undeniable circumstance that when you buy a washing machine, you must have soap. And the idea of getting free a year's supply of soap seems to register with purchasers.

So our offer is generally worded something like this copy from one of our newspaper advertisements: "Save $16! Get 60 packages of soap without charge, plus a $10 reduction on this late model washer. Regular price of washer alone, $79.95; regular price of 60 packages of soap, $6.00; total value, $85.95. You get both the washer and the soap during this sale for only $69.95."

In this advertisement, there was very little sales talk about the washer. Eight short, black-face lines, to be exact, pointed out the mechanical features of the washer. Not much more than 25 words about those features and these words occupied just a spot in a three by ten newspaper ad.

But 50 words were used, many of them big and black, and spread out so as to occupy two-thirds of the space available for type, about the combination offer that includes a free case of soap. Yes, we believe in letting soap carry much of our sales argument on washers.

Twice a year, the proposition is made even more attractive, with the addition of two roller tubs. Thus, $6.00 worth of soap and $6.00 worth of roller tubs are offered free with each purchase of a washer. However, addition of tubs does not seem to electrify washer prospects. We believe we might get along without the tubs, but we will never give up the soap premium.

Premiums notwithstanding, however, time-honored merchandising appeals and precautions cannot be neglected.

Simple lines and eye appeal of the appliance are important and we credit last year's volume, to a certain degree, to the manufacturer's emphasis upon these factors.

Price Range Important

Price range is important, too. We find that a broad price range in our line is a distinct advantage. A washer to fit almost any pocketbook, with the price stepping up at $10 a step—$49.95, $59.95, $69.95, $79.95 and $89.95.

Another recognized essential is the necessity of keeping salesmen constantly alert with information about the appliance and also alert to search out prospects, so our salesmen's school on washing machines is in constant operation, under the direction of the supervising salesman in each community.

Furthermore, we find contests for salesmen especially valuable incentives. Sometimes these contests offer trips, such as world's fair trips last spring, or overcoats and suits in winter, or cash, as in the case of a contest recently closed on washing machines, in which we paid salesmen $400 in cash prizes as bonuses.

Bonus Plan Effective

This contest began on July 31 and ran through September 9 and its principal objective was to get salesmen to clean out their prospect files and turn forgotten prospects into sales—in addition, of course, to building volume.

These figures are illustrative of the way the contest functioned: If, during the period of the contest, a salesman sold only three washers, his bonus was $1.50; four washers, $2.50; five washers, $3.75 and so on, up to a $25 bonus for the sale of 12 washers during the period.

If a man sold seven washers, for example, his bonus was $7.50, or at the rate of $1.07 per washer, but if he sold 12, his rate of bonus was $2.08 per washer. The more washers he sold the more profitable became his bonus bracket. In this six-weeks contest we sold 200 washers.

We believe the contest that gives the salesman an opportunity to increase his income is quite valuable. There will never be much change, in that respect, in the trend of relations between salesmen and employers. We hitch our quotas to such contests just as regularly as we rely on special promotions, and the contests pay us dividends in volume.

One trend we notice in the washer field has been quite gratifying and somewhat surprising. It is the increase in the demand by farmers for gasoline engine washers. Our demand for this type of washer is 15 per cent above what it was a year ago and we are buying, accordingly.

We have not yet completed an inquiry to determine what is responsible for this condition, but it is encouraging that the farmers in our territory seem to have more money now, although transactions

OKLAHOMA TIRE & SUPPLY CO.
Save $16!
Get 60 Packages of RINSO Soap Without Charge . . . plus a $10 REDUCTION
..on this Late Model
Apex Washer
Regular price of washer alone $79.95
Regular price of 60 packages RINSO $6.00
TOTAL VALUE—$85.95
You get BOTH the washer and soap, during this sale for only . . .
$69.95
Look at these Features!
Phone today for a FREE Home Trial!
Only 95¢ Per Week!
Oklahoma TIRE & SUPPLY CO.
QUALITY PRICE
"HOME OF BETTER VALUES"

Of all of the various promotional schemes used none has been so successful for this dealer as the old favorite of giving a case of soap free with every washer. Mr. Sanditen's explanation of this is that every housewife realizes that she must have soap, and the idea of getting a year's supply registers very favorably with her.

with rural customers remain preponderantly on a time basis. We expect to sell about 500 gasoline motor washers this year.

Another increase in demand is for ironers, the increase again being 15 per cent over this time a year ago, but by comparison with our overall business in ironers, this does not indicate a great volume.

Ironer Sales 10%

Ironer business, with us, has been running about 10 per cent of washer volume and when we consider the inadequacy of this picture, we can find only ourselves to blame.

Perhaps we should put the pressure on our salesmen and insist that they devote more attention to ironer prospects, but at that point you encounter a situation of some delicacy. Our salesmen are inherently afraid of ironers and it is doubtful if we will ever force them to embarrass themselves.

Some day, possibly, salesmen of our firm will forget the tradition that it is strictly a woman's job to do the ironing. We have a num-

(*Continued on page* 46)

IES Lamps "Light the Way" To Profitable Sales

By Roy A. Palmer

Illuminating Engineer
Duke Power Co., Charlotte, N. C.

MERCHANDISERS of portable lamps and other lighting equipment should quickly realize that there is a splendid opportunity this fall to do a marvelous selling job.

Thousands of people in every community are literally starving for light; portable lamps and newly designed equipment for light conditioning are available in better design and at lower cost than ever before to satisfy the need for more light; the promotional program on I.E.S. lamps and Better Light-Better Sight during the last six years has acquainted these light-starved folks with the value and necessity for more and better light with the result that an acceptance has been built up with the public that has lessened sales resistance immeasurably; and electric rate reductions have reduced operating cost so that every home —even in the lowest income group —can afford to operate these sight-saving lamps.

All of this indicates that the time is now propitious for profitable activity in portable lamps and other lighting equipment.

New Sales Approach

The developments of the past several years have contributed new selling slants and approaches in merchandising this equipment. If we but recall that the light meter is only a few years old, we can appreciate that in this device alone we have a relatively new tool to help us to sell. Seven or eight years ago we had the "Science of Seeing" but it was still enveloped in technical terms and complex phrases that didn't adapt themselves to the conversation and thinking of the housewife and the man in the street.

We didn't have the I.E.S. lamp at that time either, or the other equipment which I.E.S. design influenced toward better lighting results.

The Better Light—Better Sight program came to help us interpret the Science of Seeing in layman's terms. The light meter was developed to help us evaluate and appraise lighting conditions where seeing work was to be done. The I.E.S. lamp filled the need for a scientifically designed, economical and practical piece of lighting equipment. Now, after six years, upwards of ten million I.E.S. lamps have been sold. They do not even begin to satisfy the needs of the market. Surveys show that even where a good selling job has been done the saturation is less than one I.E.S. lamp per home although practically every home can use a minimum of five I.E.S. lamps. Obviously, only a beginning has been made in potential I.E.S. lamp sales.

An I.E.S. lamp presents a much greater merchandising opportunity than an ordinary lamp. Its various features as well as its background and experience provide excellent opportunities for unusual display ideas, advertising copy and talking points.

Ordinary lamps are usually designed to be seen but not to see by. The I.E.S. lamp was designed to incorporate both good seeing results and good appearance. The height of the lamp was carefully determined from the engineering viewpoint of providing a wide circle of illumination and preventing glare from the top of the lamp. The reflector bowl plays the important part of softening the light in the downward direction toward the seeing task and reflecting a certain portion of the light to the ceiling to illuminate the room generally and thereby relieve the contrast which might otherwise exist between the brightly lighted work and the rest of the room.

Facts to Help You Sell

Authorities tell us that dangerous strain may be placed on the eyes if one has a brightly lighted task and no other light around the room. The eyes glancing up from the work accommodate themselves to the darker portion of the room. Looking back at the work again, they accommodate themselves to the brighter lighted work. Frequent changes such as this may not only be annoying but harmful. The I.E.S. lamp design provides illumination to minimize this condition.

The weight of the base must be sufficient to prevent toppling over when tipped to an angle of 10 degrees within vertical. The shade must be white lined to reflect the maximum amount of light down on the work. A light meter will show that the shade taken from the lamp and then replaced will sometimes double the illumination on the work showing that scientific design makes for greater efficiency. The three-lite lamp provides varying degrees of illumination: dim, "conversational" and "detail-seeing" illumination. The fact that I.E.S. lamps are submitted

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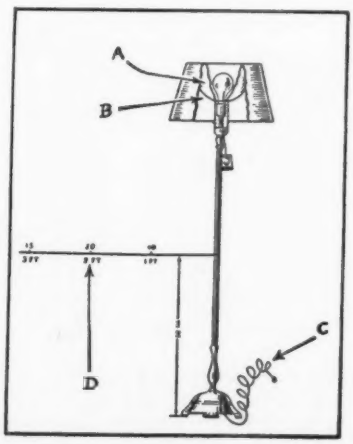


Don't sell I.E.S. lamps as you would ordinary lamps. Capitalize their performance, tremendous acceptance, and their unique design. Here are some of the distinguishing characteristics of an I.E.S. lamp: (A) The glass reflectors produce a well-diffused light but are not so bright themselves as to produce annoying glare. (B) Reflection factor of the inner surfaces of the shades are high so that adequate light will be reflected and a minimum absorbed. (C) Rubber of the cords is of a composition which will not adversely affect the copper. (D) A wide spread of ample but soft illumination is provided, the values given being minimum illumination in foot-candles at various distances from the lamp.

CONTRACTING SECTION

Testing Equipment Pays Its Way In Industrial Contracting

ONE of the most complete arrays of testing apparatus possessed by any electrical contractor in the South has enabled the White Electrical Construction Company not only to engage in a highly specialized and profitable industrial contracting operation, but has vastly increased the efficiency and profit of the firm's routine electrical construction and power installation work, with important savings resulting both for the contractor and the customer.

In addition to savings achieved by the accurate determination of conditions in power installations which may be reducing efficiency, checking and recording apparatus has been responsible for a great deal of new business for the company, where the instruments conclusively proved the need for changes, additions or repairs.

"In working with and servicing large industrial plants, whose machinery must of necessity be in perfect running order," said C. F. Patterson, manager of the firm's reconditioning department, "we have had to equip our organization with modern testing equipment in order to handle maintenance and repair work efficiently and with a minimum of delay. The best engineer is sometimes helpless to discover some obscure factor which may prevent machinery from operating at peak efficiency, and it is in such cases that our testing instruments are indispensable, and have both brought us new business and increased our profits and the customers' savings."

Equipment in Use

The chief items of equipment upon which the company depends in its industrial engineering operations are a curve-drawing watt meter, used for checking motor loads; a power factor meter to check load power factors; an indicating ammeter for checking line amperage up to 800 amperes; and a "clip-on" ammeter with a range from 10 to 600 amperes, for use when it is not feasible to break an a-c circuit required for continuous operation. The graphic watt meter produces a chart, thus recording power fluctuations, with a range up to 800 kilowatts, and can also be used to indicate reactive volt-amperes. Other meters of various ranges are used for checking voltages, such as indicating volt meters registering up to 750 volts, and a special direct current ammeter with a maximum scale reading of 200 amperes.

Another valuable instrument which comes into frequent play in industrial plants is a special tachometer for measuring the rpm of motors and associated equipment.

In the motor test room of this company is a special test board for handling motor loads up to 25 kilowatts, on two- or three-phase motors up to 2200 volts.

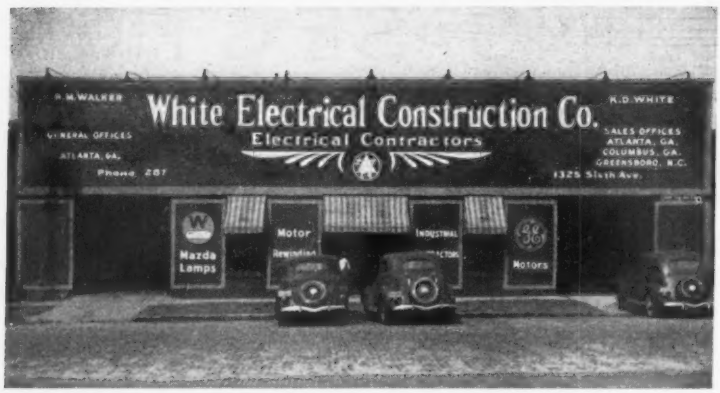
All of these instruments and testing equipment play an important part in the industrial operations of the White company. In preparing plans for plant expansion and extensions of circuits, or distribution system modernization, the company finds that correct load data obtained from actual surveys is essential.

Motor Analysis Facilitated

In the case of motors, such tests indicate whether a motor is too large for a given application with resulting higher operating costs; or whether a motor may be too small to handle the load to which it is connected with corresponding danger of overload and damage.

An illustration of how instruments and careful testing methods prevent unnecessary work and expense and assure customer satisfaction is to be found in a recent

Instruments and testing equipment are used to advantage by the White Electrical Construction Co. in their highly specialized and profitable industrial electrical contracting operations. Most valuable instruments are curve drawing watt meters and power factor meters.



The White Electrical Construction Company serves a large area in the Southeast, including Georgia, Alabama, North Carolina and parts of Virginia. The Columbus, Ga., sales office is shown here. Another sales office is located in Greensboro, N. C., while the general office of the firm is located in Atlanta.

incident. The company had just sold a 50 horsepower motor for a rip saw application. The customer complained later that the motor would not pull the load; that it slowed down with the pressure of work and seemed to strain. The company engineers immediately made tests and found that the motor at certain points of short duration reached loads as high as 100 horsepower. Next, they made a speed test with the tachometer and found that the motor did not fall below the manufacturer's rating. These two facts checked against each other and showed that the motor was in no way at fault. After a few minutes of searching for the trouble, it was found that a belt was slipping and causing all of the trouble. The belt was repaired and the saw then performed perfectly.

By the simple use of these instruments, costly moving and changing of motors was averted. In this case, a larger motor might have been able to pull the load with the defective belt but it would have wasted electricity by lost motion, thus costing the customer more for operation, and it would not only cost the company for changes but would have lost many customers through not satisfying one man.

Graphic Meters Most Useful

Tests with the curve drawing watt meter and power factor meter have affected savings of many thousands of dollars to customers and has resulted in increased business for the company. When properly interpreted, their readings disclose other conditions than merely the load and power factor of the circuit under test. Here are some of the unusual conditions encountered:

In making routine load tests on the motors in a cotton mill, a 25 hp, 1160 rpm induction motor was found to have a power factor of 55% although the watt meter indicated that the motor was carrying full load. Investigation of the motor showed that it was connected improperly and was suitable for operation on only half the voltage at which it was operating. This motor was naturally running hot but cooled off considerably after the change in connections, and the power factor rose to 82%.

In another case, which was also in a cotton mill, the company was asked to make tests on a number of spinning motors. The motors were 25 hp, 1160 rpm, each motor driving four spinning frames. The load on all motors was nearly the same but there was a great difference in their power factors. As these motors were all identical, it was apparent that there were errors in some of the stator windings. A discussion with the superintendent of the plant resulted in subsequent rewindings jobs being given to this company.

Capacitors Recommended

In another case, tests were made in a large laundry which generated its own power. The tests were made on the generator which was known to be overloaded and running very hot. These tests showed that the generator was carrying a large lagging current, due of course to lightly loaded and small induction motors.

The use of capacitors was recommended and they were installed on the various circuits to bring the power factor up to 95%, which has greatly reduced the generator heating and made available some power for future extensions.

A somewhat similar condition existed in a large rayon plant. The

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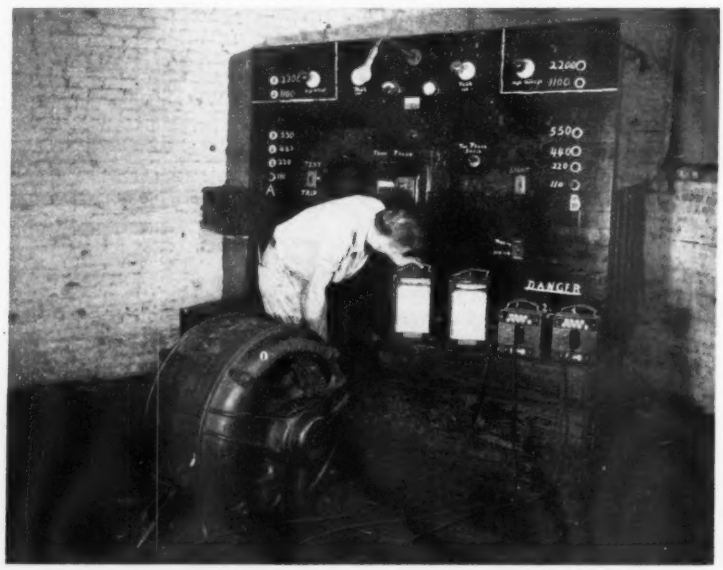
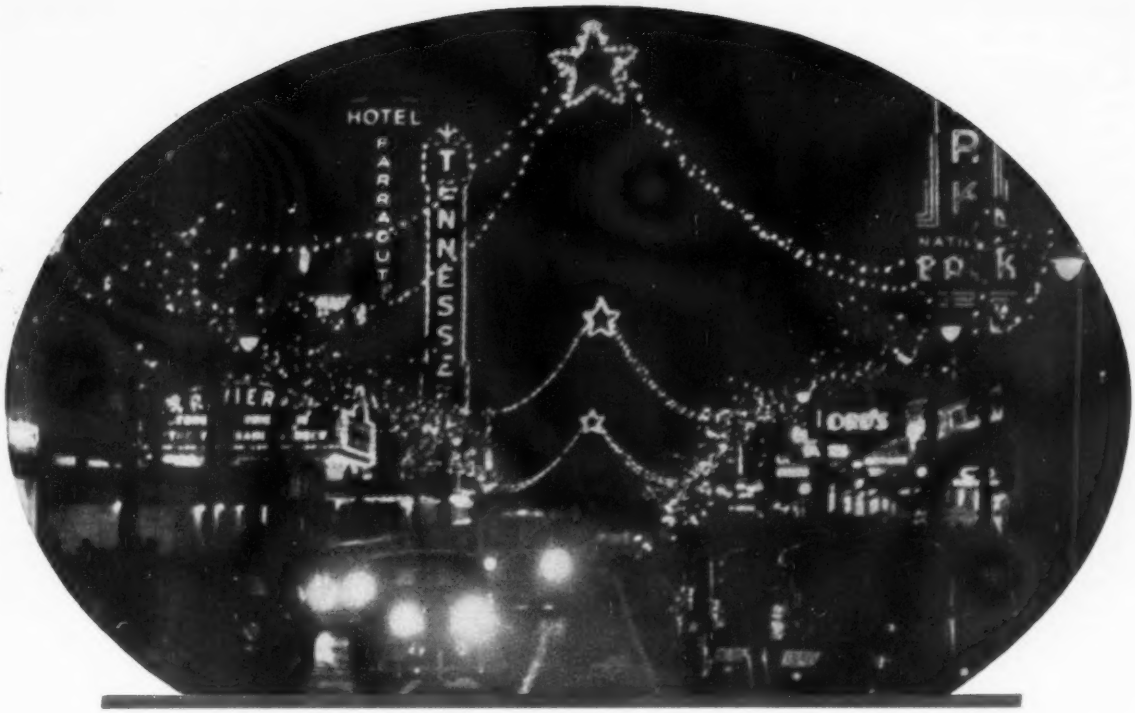


A White company engineer "diagnoses" a motor ailment, utilizing the company's motor test board in the Columbus branch in conjunction with curve drawing instruments. The test board provides loads up to 25 kilowatts for two- or three-phase motors up to 2200 volts.



"ELECTRICAL CITY" APT NAME FOR KNOXVILLE DURING HOLIDAY SEASON

COOPERATION between electrical contractors, dealers, and the City Electrical Department of Knoxville, Tennessee, is now underway to make Knoxville an "electrical fairyland" during the Christmas holidays through street lighting and decoration in the downtown district. Present plans call for all decorative lighting to be turned on November 23 and to be lighted every night until after the New Year celebration.

Visitors from all over the United States commented last year on what they called the "unusual beauty" of the electrical displays in the business district and said it reflected the Christmas spirit better than anything they had seen.

Sponsored by Junior Chamber

The idea started as a move by the Junior Chamber of Commerce to prove that Knoxville is the "nation's first electrical city." The organization wanted to show how such an electrical city could put on a real electrical Christmas, and they were much encouraged by the success of the Tennessee Valley Electrical Exposition.

Last year's plans were started long before Christmas and with the 1939 Christmas season nearly here they are beginning to blossom into an even more elaborate electrical spectacle.

A large committee from the Junior Chamber of Commerce, under the direction of Frank Powers, at the outset canvassed the business section to sell merchants on a Christmas lighting plan. Mayor Walter Mynatt was a leader in making it a success.

The City Electrical Department offered to provide all electricity free for the elaborate festoons of multi-colored lights. The city proposed to buy the wire, globes and all decorations on a competitive bid basis, prorating the actual cost to the merchants in the area. Last year, the cost of lighting and decorative equipment amounted to $1.25 a front foot.

But this Christmas the cost is even less to the same participating merchants; it has been reduced to a maximum of 60 cents a front foot, because the decorations were carefully stored after Christmas for use in the 1939 season.

The principal decoration consists of electrically-illuminated ropes of green laurel and red wreaths, which are strung along above the curbing in front of the stores. At street intersections are great festoons which cross each other diagonally across the street, with a huge ornament in the center.

15,000 Lamps Used

Approximately 15,000 bulbs are used, which add a half-million candlepower to the downtown street lighting, according to Max Bartlett, general manager of the City Electric Department.

Each of the huge stars over the intersections contains 40 lights and in the streamers running from the brilliantly lighted stars are 150 lights. There's a light every foot of laurel roping along the main business street.

Last year, the electrical fairyland was turned on with considerable ceremony. As a sharp fire

siren sounded, electricians at six switches turned on the Christmas lights. Knoxville High School Band played "Jingle Bells," and speeches were broalcast.

Strings of colored lights were flashed on over a big municipal Christmas tree on Market Street, where carols were sung.

Color, particularly, marked the "electrical fairyland." Red, green and blue lights were in festoons along each side of the brilliant stars at intersections. Even the conventional street lights were in Yule colors.

The idea of an electrical Christmas spread throughout the city. Electrical dealers encouraged home displays, with contests for which prizes were awarded. One contest was for homes valued at more than $6,000 and another for homes under that amount.

Among electrical dealers and wholesalers contributing to the contests were General Electric Supply Co., Graybar Electric Co., Briscoe Electric Co., Wright-Cason Electric Co., Roden Electric Co., Acme Electric Co., Ideal Electric Co., Knoxville Electric Co., Fowler Bros. Co., Scott Electric Co., Moses Electric Co., Electric Service Co., S. H. George & Sons, Stokes Electric Co., and W. F. Cale, electrical contractor.

Electric shops were kept busy selling merchandise and furnishing people with ideas. As an example, consider the activities of the Electric Service Co. This firm went in exclusively for both contracting and merchandising, showing how contractors and dealers alike could tie-in with the electrical Christmas idea. For example, boxed advertisements were carried in the *News-Sentinel,* which offered special rates on installation of Christmas tree plugs and wiring.

Novel Christmas decorations of all kinds were featured by Electric Service Co. in addition to the usual electrical appliances as gifts. Weeks ahead of Christmas, a lay-by plan, with a small down payment, was offered.

"We find that a company can do a good deal of business at Christmas time, both in contracting and on merchandising," said V. G. Armstrong, of Electric Service Co.

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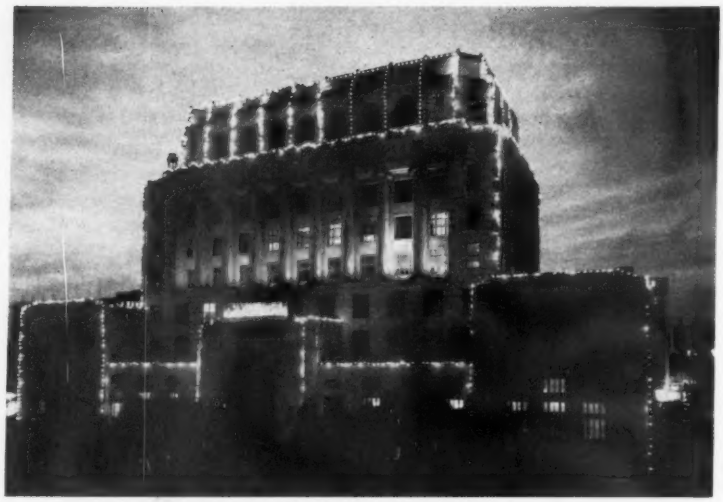
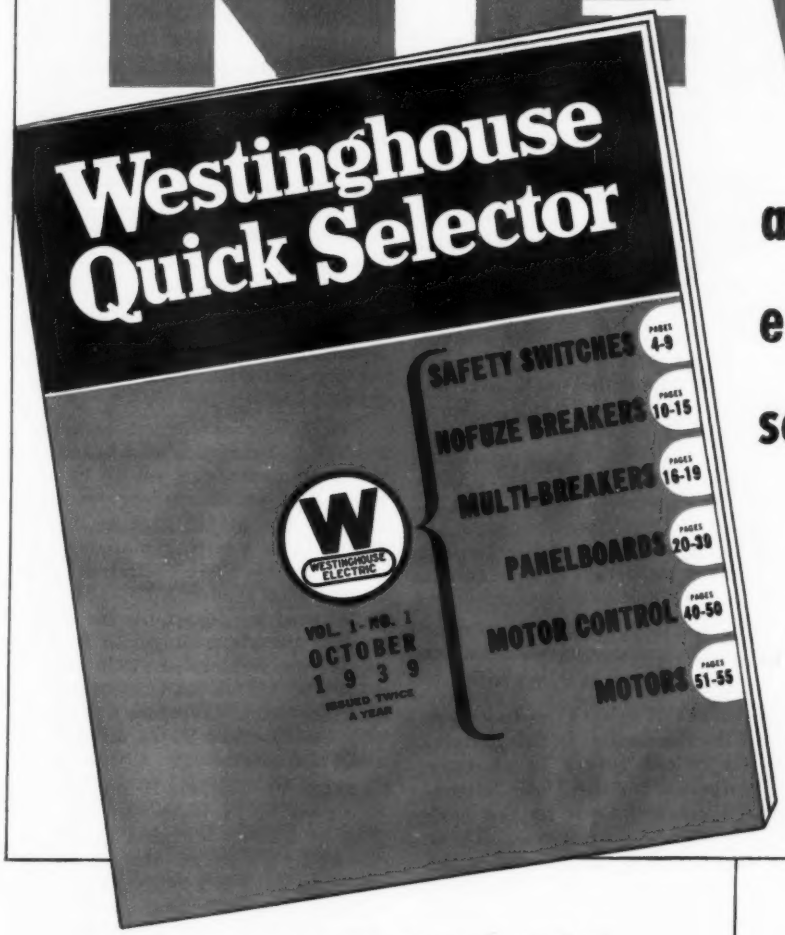


The Caddo Parish Courthouse, in Shreveport, La., was a brilliant expression of the beauty and goodwill of the Christmas season last year. 5000 30-watt lamps, 18 500-watt flood lamps, and 4000 feet of streamer wire were required for this attractive outline lighting. Frank Camus, city electrician, and Charles Serwich, electrical contractor, get credit for the attractive design of lighting installation.

An outstanding campaign on Christmas lighting equipment and decorations is staged each year by the Electric Service Co., of Knoxville. V. G. Armstrong, of that company, reported that the extensive downtown Christmas lighting helped sales of this equipment considerably. Below, Mr. Armstrong looks at one of his window displays. At right is one of the prominently located display counters.

NEW



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Understanding and Using the National Electric Code

By B. Z. Segall

New Orleans Public Service, Inc.
New Orleans, Louisiana

THIS article, outlining the requirements for feeders, is very important as its rules form the basis for the calculations for service conductor size.

Section 2201 recommends that feeders be designed to give a maximum voltage drop of 3% up to the final distribution point of the system. A change has been proposed for the 1940 code to limit the 3% to power loads only and to extend this advisory rule to include a recommendation of a 1% drop for lighting or combined lighting and power feeders.

Many contractors and wiring design engineers lose sight of the importance of voltage drop. In the case of a motor circuit, this voltage drop condition is overcome to some extent by a mandatory requirement of a minimum circuit size, 25% above the full load running current of the motor. Motors are not very sensitive, in most cases, to ordinary fluctuations in line voltage. We find that a 10% variation above or below the nominal voltage rating of a motor will not materially affect the operating characteristics of the motor. However, some thought should be given to the voltage drop of motor feeders to keep line losses to a minimum. A No. 14, 220-volt motor feeder, carrying about 12 amperes, can be extended for about 100 feet before a 3% drop in voltage is encountered in the circuit wiring.

Lighting circuits are much more sensitive to voltage variations. As was pointed out in a previous discussion, a 3% reduction in lamp voltage will cause a 9% reduction in light output. This condition is further aggravated if the circuit feeds a combination lighting and power load. Upon starting, the various motors draw a heavy load and cause a momentary voltage dip. This potential drop reflects itself in a very annoying manner in the lighting portion of the circuit by causing the lamps to flicker. This experience is a very common one to many of us having electrical refrigeration, washing machines, etc. Because of the greater sensitivity of these lamp circuits to voltage variations, the 1940 code proposes to recommend that feeder sizes be designed to have a maximum of 1% voltage drop.

As stated in the above discussion these voltage drop rules are only recommended and are not mandatory requirements. However, their importance cannot be over-emphasized and it would be well for contractors, architects and engineers to treat them as definite Code requirements in planning all their wiring layouts.

A very important change for the 1940 code has been recommended in the requirements for the feeder size. If a two-wire feeder supplies two or more two-wire branch circuits, or a three-wire feeder supplies two or more three-wire circuits, then the feeder must be No. 10 wire or larger. It is further recommended that the 1940 code require the feeder to be the same size as the service entrance conductors if these conductors are No. 8 or smaller, and if the extire load supplied by the service entrance conductors are carried also by the feeder.

The feeder size must be large enough to carry the load based on the computations as set up by the minimum standards of section 2202 or the actual load as determined from a wiring plan, whichever of the two requires the larger size feeder. This can be illustrated by designing the feeders for the store shown in Figure 17. (See September 1939 issue, page 36). This load is strictly a lighting load, therefore only the rules of section 2202a apply for the calculations.

Table 17, Chapter 9, requires a minimum of 3 watts per square foot at a 100% demand factor as shown by the fourth section of the table on page 281 of the Code. In addition, the note at the bottom of this table requires an additional 200 watts per lineal foot of show window lighting.

Based on these minimum values the main feeder for this store must carry for general lighting: 100 feet x 48 feet x 3 watts per square foot = 14,400 watts; and for show window lighting, 2 windows x 33 feet per window x 200 watt per foot = 13,200 watts; or a total of 27,600 watts.

The actual load however is: 24 lamps @ 500 watts = 12,000 watts; 64 lamps @ 300 watts = 19,200 watts; and 12 lamps @ 150 watts = 1,800 watts: or a total load of 33,000 watts. This is greater than the minimum load as determined from the requirements of section 2202a. The feeders, therefore, must be large enough to

EDITOR'S NOTE—In much of the discussion in this article, Mr. Segall refers to changes proposed for the 1940 National Electrical Code by the Article 220 Committee. These changes were published in the supplement of the I. A. E. I. News Bulletin entitled "Article Committee Reports to the 1939 Meeting of the Electrical Committee."

The editor directs attention to the fact that a supplementary report has been issued by the Article 220 Committee outlining further proposed changes in this article pertaining to "Feeders." This supplementary report was described in detail in the September 1939 issue of ELECTRICAL SOUTH, page 20.

The actual changes to be incorporated in the 1940 Code will depend, of course, upon the action of the Electrical Committee when it meets in December.

carry the 33,000 watts obtained from the wiring plan and not the minimum value of 27,600 watts set up by section 2202a.

Based on a three-wire 230-volt circuit, the 33,000 watt load requires a wire large enough to carry 33,000/230 = 140 amperes, and the 27,600 watt load would require a wire large enough to carry 27,600/230 = 120 amperes. Based on Table I, Chapter 9, the first load would require three No. 2/0 cables and the second, three No. 1/0.

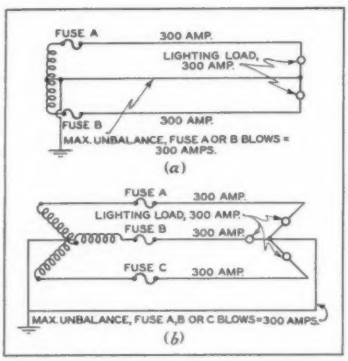

Fig. 18. Simple feeder circuits for lighting loads are shown here for both three-wire and four-wire systems.

In connection with the above illustration it must be pointed out that Table 17 on page 280 of the Code has a mandatory requirement for the feeder sizes. The last paragraph on this page definitely states that the values in Table 17 are based on average load conditions and the feeder size must be increased, if necessary, to carry the actual load. A code change has been proposed to augment this subheading by including in it a recommendation that feeder capacity be increased "to permit of efficient and economical operation without expensive alterations and replacements in the system." In other words, an attempt should be made in the design of every wiring system to include some reasonable amount of excess capacity for future increases of loading.

The I.A.E.I. recommended that ample feeder capacities be assured for residential occupancies by increasing the wattage per square foot in Table 17 from 1 watt to 2 watts. This proposal has not, however, been approved by the Electrical Committee's Article Committee Reports. (Editor's Note: This proposal has been included in the Article 220 Committee's Supplementary Report).

The lighting load is usually but a portion of the wiring system to be supplied by the feeders. Small appliances such as toasters, irons, roasters, etc., large appliances, ranges and motors are rapidly becoming a major item of current consumption on many installations. Section 2202b and 2202c outline the minimum computation for feeder requirements supplying these appliances, ranges, and motors.

It will be noted that in calculating the minimum feeder load, an additional 1000 watts for small appliance loads must be added to the lighting load calculated in section 2202a. This, of course, applies only to the calculations for a single family dwelling or the individual apartments of a multi-family dwelling. When calculating the feeder load for a group of individual apartments, the code recognizes the fact that the various small appliances in these apartments will not all be used simultaneously. Therefore, there has been set up a table of demand factors, based on actual tests, to determine the average simultaneous demand to be expected in various size apartment buildings from the use of small appliances. Again, it must be borne in mind that Table 18A, Chapter 9, sets up minimum standards and it behooves the wiring system designer to increase this factor if for any reason he may feel that the demand will actually be higher due to a greater than average use of appliances in the building.

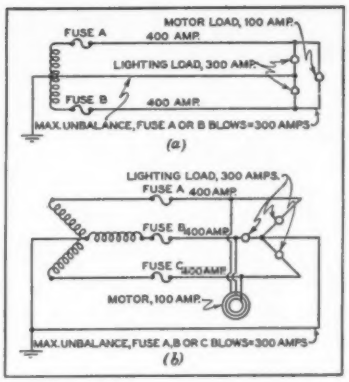

Fig. 19. Effect on maximum unbalanced neutral current of combined 220-volt motor and appliance load with lighting load on feeder circuit is shown here for both three-wire and four-wire systems.

The use of Table 18A is quite simple. This appliance load must be added to the lighting load calculated in accordance with Section 2202a. Referring to Figure 14 (see September 1939 issue, page 35) of this discussion, it will be noted that the feeder lighting load based on section 2202a and Table 17 is: 72 feet x 14 feet x 1 watt per square foot x 100% demand factor = 1008 watts.

A 100% demand factor is used, since Table 17 has set up this factor for single family dwelling and individual apartments having 2000 square feet of area or less. Any single dwelling or apartment having in excess of 2000 square

(*Continued on page* 40)

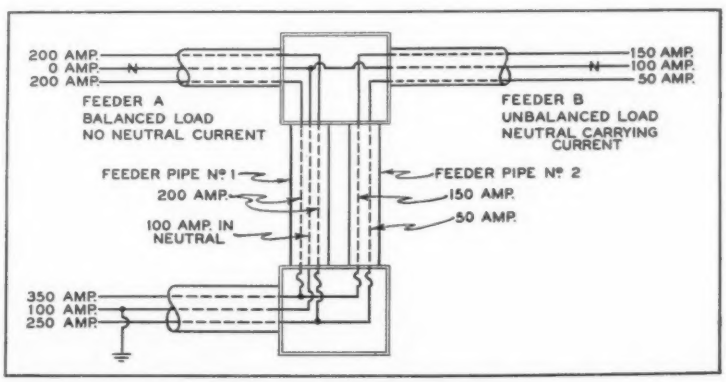

Fig. 20. A violation of section 3052 of the Code is indicated here. The neutral current flowing in the neutral conductor in Feeder Pipe No. 1 has no corresponding phase wire current in the same pipe with the result that its magnetic field will induce a voltage in the conduit. Similarly, there is an unbalance of 100 amperes in the phase wires in Feeder Pipe No. 2 which will result in an induced voltage in that conduit. Since the metal junction boxes complete a circuit through the two feeder pipes, and since the induced voltages in the pipes are opposite in direction, circulating currents will be established which will heat the conduits.

ENGINEERING SECTION

Experience with Shunt Capacitors

Oklahoma Gas and Electric Co. has made extensive use of shunt capacitors on primary distribution feeders. Nearly three years of operating experience are described here*

By R. F. Danner
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and
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Transmission-Distribution
Department
Oklahoma Gas and Electric
Co., Oklahoma City.

IN 1936, the need for additional system power factor correction became obvious, and comparisons of the economics of feeder capacitors distributed over the primary distribution systems versus the use of large synchronous condensers, proved in the economic application of some ten to fifteen thousand kva of feeder circuit capacitors. Actual locations were made at points where maximum value would accrue, such as at points where voltage improvement was needed, or where substation transformers or feeder control equipment was approaching full load at relatively low values of power factor.

In general, the capacitor kva installed on a circuit has been made about equal to the lagging kvar on the circuit during the minimum load period, thus correcting the circuit power factor to 100% at the time of minimum load. These determinations were based on circuit load tests made during the summer months. The majority of these capacitor installations have been in three phase groups located toward the ends of three phase branches, although, where desirable from a voltage standpoint, single phase groups have been located toward the end of single phase branches of the circuit. The data sheet in Figure 1 shows a typical capacitor location.

Capacitor Installations

The application of these capacitors on the primary distribution systems was started in 1936. Previous to that time there had been a few installations made by customers for power factor correction. Capacitors connected to the system, including industrial installations, are shown in Table I.

The installations made in 1936 consisted of indoor units installed in suitable housings for pole mounting. When the outdoor unit was made available in 1937, the purchase of housed type equipment was discontinued and all subsequent installations, except a portion of those privately owned or leased, have been outdoor type units arranged for group mounting on cross arms.

Effect on Load and Voltage

A tabulation of data is given in Table II which shows the effect of capacitors on the power factor conditions prevailing on the 66 kv transmission system. Comparisons of columns 4 and 6 show the improvement in system power factor produced by the capacitors.

Since most of the capacitors are operated at approximately 5% above rated voltage, the actual corrective kva exceeds the capacitor kva shown in column 5 by about 10%.

Table I
Capacitor Installations—Kva

Year Installed	Customer Owned or Leased	Primary Distribution Capacitors	Total
1932	1080	-----	1080
1933	90	-----	90
1035	570	-----	570
1036	320	2600	2920
1937	550	12165	12715
1938	1295	565	1860
Total	3905	15330	19235

In order to determine the effect of capacitors on a substation and its feeder system, several tests were made in 1936 and 1937 to determine load and voltage conditions on all circuits and equipment associated with one of the larger 13/4 kv stations serving primarily residential and small commercial customers.

The data sheet, reproduced in Figure 1, shows the feeder and substation arrangement and a table of information for one set of tests. Data were taken with the capacitors off and with the capacitors on. Encircled numbers on the circuit sketch are test points and appear also in the column headings of the data table to identify the locations at which data were taken. A voltage profile plotted from these data is also shown on this sheet.

Capacitors totaling 1,620 rated kva were connected on the "capacitors on" tests. All of the installations are 2300 volts, wye connected, with the capacitor station neutral connected to the feeder neutral.

Capacitor Failures

A total of 13,620 kva of 15 kva, single phase outdoor capacitor units are now installed on the system. Most of these were installed during 1937. Up to January 1, 1939, the following failures of this type of unit have been experienced:

2 units, 30 kva—due to misapplication or mechanical damage in handling.

5 units, 75 kva—due to internal electrical failures, cause unknown.

2 units, 30 kva—internal electrical failure reported as due to

* *A memorandum on this subject was presented by the authors at the 19th meeting of the E. E. I. Transmission and Distribution Committee, in Chicago, May 3 and 4, 1939.*

factory errors in assembling the internal strap connection.

1 unit, 15 kva—broken solderless connector on bushing.

2 units, 30 kva—leaks at solderless connectors on bushing (design corrected by manufacturer).

1 unit, 15 kva—leaks at welded seam in tank.

The mechanical defects and some of the electrical failures may be attributed to manufacturing defects. It would be expected that these would ordinarily manifest themselves soon after installation. Three failures occurred during 1938, all of which were electrical failures of unknown cause and represent a failure rate of .33% for that year.

Operating Difficulties

No unusual fuse blowing or conditions of resonance have been experienced. If any resonant conditions exist, they have not resulted in equipment damage or otherwise made themselves known. Some inductive coordination problems caused by the installation of capacitor equipment have been investigated. They may have been associated with resonance or partial resonance at some harmonic frequency.

Table II—66 kv System Load Power Factor

(1) Date	(2) Max. Temp. This Day °F	(3) Time of Reading	(4) System Load Power Factor	(5) Capacitors Connected RKVA	(6) System Load Power Factor Calculated For Capacitors Off
8-11-36	113	2 PM	72.5%	1 740	71.7%
9-9-36	97	11 AM	73.5	1 740	72.8
9-9-36	97	8 PM	78.5	1 740	77.8
3-29-37	43	8 PM	86.7	4 650	84.9
4-17-37	89	8 PM	80.9	4 770	79.1
6-19-37	96	9 PM	81.1	5 891	78.9
6-22-37	105	9 PM	79.9	5 891	77.8
6-22-37	105	10 AM	72.5	5 891	71.5
6-23-37	102	10 AM	75.1	5 891	72.9
7-3-37	98	9 PM	78.1	6 476	75.8
7-31-37	97	9 PM	80.9	6 476	78.6
8-3-37	106	10 AM	75.3	6 926	72.9
9-9-37	94	8 PM	83.0	10 331	79.8
10-6-37	97	7 PM	80.8	12 716	76.4
12-3-37	42	6 PM	90.9	14 830	86.0
1-31-38	32	7 PM	86.9	17 375	80.1
3-28-38	54	8 PM	89.2	17 940	81.2
9-1-38	102	7 PM	86.0	18 650	79.4
12-20-38	38	6 PM	88.6	19 235	81.8

Although the telephone company reports that noise levels have been generally increased by the installation of feeder circuit capacitors, only four specific complaints have required investigation. Of these, two have been from delta connected capacitor installations on 2.4 kv feeders and two have been from wye connected installations on 4 kv, 4-wire primaries. Corrective action was

DATE	TIME	CONDITION	GENERATING STATION 13 KV												24th. St. SUBSTATION						CIRCUIT 701 - 4 KV - 4 WIRE								
			13 KV BUS	SWITCH 010					SWITCH 012						13 KV BUS	4 KV BUS TOTAL UNREGULATED					TOTAL LOAD						VOLTS ϕ to N		
			VOLTS K=120	KW K=1	AMPS K=1	KVA K=1	P.F. %	KVAR K=1	KW K=1	AMPS K=1	KVA K=1	P.F. %	KVAR K=1		VOLTS K=120	VOLTS K=120	KW K=1	KVAR K=1	KVA K=1	P.F. %	KW K=1	KVAR K=1	KVA K=1	P.F. %	AMPS K=1	SUB K=120	PC K=120	CAR K=120		
			(1)	(2)	(2)	(2)	(2)	(2)	(3)	(3)	(3)	(3)	(3)		(4)	(5)	(6)	(6)	(6)	(6)	(7)	(7)	(7)	(7)	(7)	(7)	(8)	(9)		
3-16-37	2-15 PM	CAPACITORS OFF	117	2600	160	3890	66.9	2900	2200	130	3160	69.6	2260		112.5	127	2300	2020	3060	75.2	584	534	792	73.8	105	128	124	122.5		
3-16-37	3-30 PM	CAPACITORS ON	117	2600	140	3400	76.5	2190	2200	110	2670	82.4	1510		114	131.5	2210	190	2220	99.6	568	92	576	98.7	71	125	124	123		

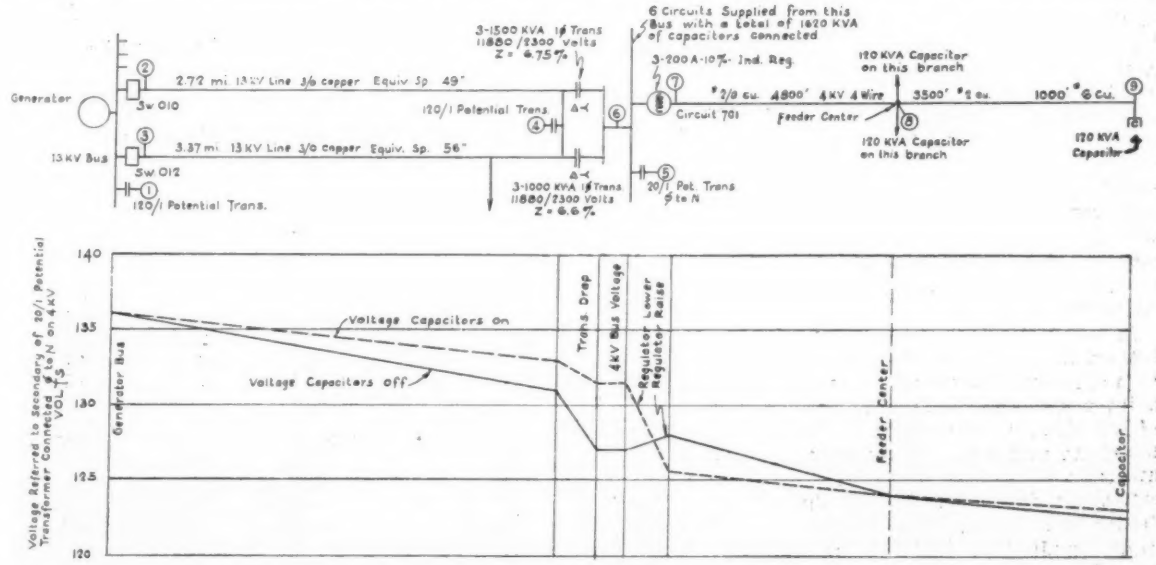

6 Circuits Supplied from this Bus with a total of 1620 KVA of capacitors connected
3-1500 KVA 1ϕ Trans 11880/2300 volts Z = 6.75%
2.72 mi. 13 KV Line 3/0 copper Equiv. Sp. 49"
Generator
Sw 010
120/1 Potential Trans.
3.37 mi. 13 KV Line 3/0 copper Equiv. Sp. 56"
13 KV Bus
Sw 012
120/1 Potential Trans.
3-1000 KVA 1ϕ Trans 11880/2300 Volts Z = 6.6%
20/1 Pot. Trans ϕ to N
3-200 A-10% Ind. Reg.
Circuit 701
Feeder Center
120 KVA Capacitor on this branch
3500' #2 cu.
1000' #6 Cu.
120 KVA Capacitor
120 KVA Capacitor on this branch
Voltage Capacitors on
Voltage Capacitors off
Trans. Drop
4KV Bus Voltage
Regulator Lower
Regulator Raise
Generator Bus
Feeder Center
Capacitor
Voltage Referred to Secondary of 20/1 Potential Transformer Connected ϕ to N on 4 KV
VOLTS
140
135
130
125
120

Fig. 1. Extensive tests were made to detemine the effect of capacitors on substations and feeders. Results of a typical test are shown in this data sheet. Encircled numbers represent test points for which test data is given in tabulation at top. Voltage profile is given below.

Table III—Telephone Noise Measurements*
June 15, 1938

Telephone Circuit	Pin Position	Capacitors Off: Noise in DB Far End Unterminated	Capacitors Off: Noise in DB Far End Terminated	Capacitors On: Noise in DB Far End Unterminated	Capacitors On: Noise in DB Far End Terminated
Metallic	25 — 26	15	22	26	27
Metallic	35 — 36	13	21	25	27
Metallic	45 — 46	14	19	28	29
Metallic	55 — 56	14	13	22	21
Metallic	29 — 30	13	11	25	25
Metallic	27 — 28	10	9	12	10
Phantom	--------	18	17	23	22
Metallic	37 — 38	12	12	26	29
Metallic	39 — 40	13	15	15	20
Phantom	--------	13	17	23	28
Metallic	49 — 50	14	11	29	27
Metallic	47 — 48	14	13	28	28
Phantom	--------	18	17	30	29
Metallic	31 — 32	10	--	20	--
Metallic	33 — 34	8	--	13	--

*Readings in line termination on 2A noise measuring set taken to drop side of coil in each case in telephone exchange.

taken in all four instances, although in one of the cases, had the capacitors been the only source of inductive disturbance, it is doubtful that correction would have been found necessary.

The first specific complaint occurred from an installation in a town of 4500 population. The exposure consisted of an open wire telephone toll circuit on one side of an alley and a three-phase, 3-wire, 2.4 kv delta primary circuit on the opposite side of the alley. A 90 kva capacitor was connected to the primary circuit about 2450 feet from the substation. The toll lead exposure was of similar length. An additional 135 kva capacitor was connected to the same circuit but so located that its current was involved in only a short section of the parallel and in a section having more than average separation. Effect of this installation was negligible.

In an attempt to analyze the factors in the inductive interference problem, telephone circuit noise was measured on a number of toll circuits terminating in the telephone exchange. These measurements were made with: (1) all capacitors disconnected from the feeder circuit; and (2) both capacitor installations (225 kva) connected.

Supplemental measurements showed that essentially all the noise increase on the toll circuits was produced by the 90 kva installation. The noise measurements obtained under the two test conditions appear in Table III.

Root-mean-square values of various currents and voltages pertinent to the analysis of the coordination problem, and harmonic magnitudes in these currents and voltages were measured as follows: (1) line currents taken by 90 kva capacitor; (2) total line current at substation on 2.4 kv bus; and (3) phase-to-phase regulated voltage at substation 2.4 kv regulated bus.

A tabulation of these power circuit data is shown in Table IV. Values shown at 60 cycles are actually RMS readings taken with conventional iron vane indicating instruments. Harmonic magnitudes were measured with a harmonic analyzer.

It will be seen from the data that harmonic components above 180 cycles in the current wave shape at the substation were increased by the capacitors and that harmonic components of the voltage wave shape 540 cycles and above decreased when the capacitors were connected, while voltage harmonics 420 cycles and below increased when the capacitors were connected.

Superficial analysis of the data indicates that the telephone noise was produced by non-triple harmonic currents in the phase wires of the primary system involved in the exposure, although sufficient tests were not conducted to positively verify this.

Corrective action consisted of temporarily disconnecting the 90 kva capacitor bank and subsequently relocating the primary feeder to provide separation of about one block from the toll lead. It is probable that other action could have been taken but the method chosen was expedient in this case.

The second specific inductive interference complaint was caused by a 90 kva, wye connected capacitor installation on a three-phase, four-wire, uni-grounded neutral,

(*Continued on page* 39)

Table IV—Harmonic Voltages and Currents
November 4, 1937

(Measured on 2.4-kv, 3-phase, 3-wire distribution system.)

Harmonic	Cycles	Regulated Voltage At Substation (K=20): Capacitors Off Volts	Regulated Voltage At Substation (K=20): Capacitors On 225 Kva Volts	Line Current Sw. No. 1 Supplying Total Town Load: Capacitors Off Amperes	Line Current Sw. No. 1 Supplying Total Town Load: Capacitors On 225 Kva Amperes	Line Current to 90 Kva Capacitor Amperes
1	60	127.00	126.00	83.30	85.50	26.30
3	180	.37	.45	2.31	2.33	---
5	300	4.60	7.59	3.22	17.00	9.16
7	420	.78	1.47	.53	7.64	2.88
9	540	.04	---	.03	.55	.20
11	660	.16	.07	.07	.41	.25
13	780	.05	.02	.07	.29	.15
15	900	.08	---	.03	---	.02
17	1020	.31	.10	.11	.40	.34
19	1140	.06	.03	.02	.10	.05

APPLIANCE Service

Proper Methods of Handling And Measuring Refrigerants

By Allen Parker

IN any trade, best efficiency and economy is usually obtained when available tools are used to the greatest advantage. Yet I have seen appliance service engineers, who pride themselves on their well chosen set of refrigeration tools, handle their refrigerant drums and charging equipment in a haphazard manner which must inevitably cause the equipment they repair to give trouble and poor performance.

Such difficulties usually arise from the fact that moisture, dirt, and other foreign material, gets into the refrigerating system, forming acid, corrosion, and abrasion. After trouble has been noted, the removal of such foreign material may necessitate a major overhauling job.

I have met service engineers who considered the handling of refrigerant, drums, and charging hose of secondary importance, never plugging the connections after their use; merely leaving them open with only the valve closed. Many such service men even guess at the amount of refrigerant transferred from one drum to another or to equipment during charging. This practice often results in waste of the refrigerant and extra time in obtaining a proper charge.

Proper handling of refrigerant may be somewhat of a problem to the smaller business or shop which is unable to afford the cost of the popular charging boards now available on the market. However, such shops should make use of the best methods available. At the very least, service men in these small shops can cultivate the habit of carefully and systematically handling refrigerants. At only a very small cost, a simple method of determining the amount of refrigerant transferred from large supply drums to small service drums can be developed, and an accurate knowledge of the amount of refrigerant in the small service drum will, at least, enable the service engineer to determine more accurately the charge being put into the equipment.

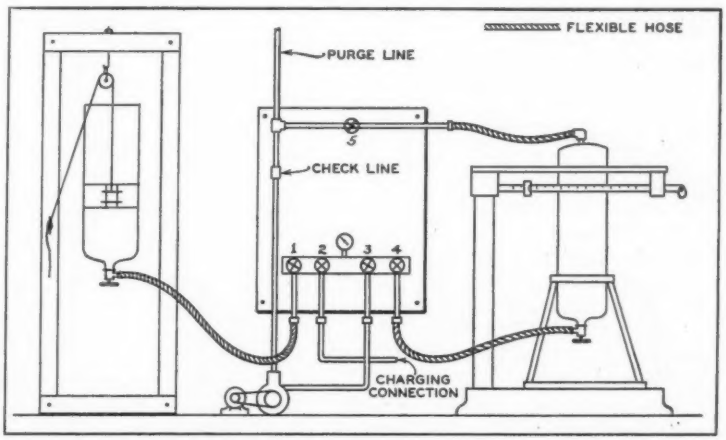
On the other hand, if service engineers employed by these small shops are still buying their refrigerant in small service drums, a considerable saving can be realized by buying in larger quantities. Obviously, the unit cost of the refrigerant will be higher when the manufacturer must supply small drums, and savings realized from the purchase of refrigerant in larger quantities will quickly offset the larger amount of capital tied up in the larger drums.

Naturally the larger drums are bulky and not so easy to handle unless a suitable means is provided for dispensing the refrigerant. A suitable rack can be constructed of two by four lumber which will be sufficiently strong and which, in connection with the use of a set of platform scales, will permit accurate determination of the amount of refrigerant placed in smaller service drums.

A simple method of handling large drums and accurately filling smaller service drums is shown in the accompanying diagram. This plan can be adapted to almost any size shop and the cost of construction will not be very much if an old set of platform scales can be located and accurately calibrated. Such a system will contribute greatly to safety in handling refrigerants, since an overcharged cylinder is extremely dangerous, both to the negligent workman and to other persons nearby. Also, if there should be an occasion where it is necessary to ship a small cylinder, the I.C.C. regulations require that the charge be limited to certain quantities.

The system shown in the dia-

(*Continued on page 24*)



This diagram shows an effective system for measuring refrigerant charges. It can be constructed at only small cost if a set of platform scales are available. The equipment to be charged is connected to the line leading from valve No. 2. In operation, valves No. 2 and 3 are closed and valves No. 1 and 4 opened. This permits a flow of refrigerant into the auxiliary drum mounted on the scales. When the correct charge has been placed in the auxiliary drum, valves No. 1 and 4 are closed. Valves No. 2 and 3 are then opened and the vacuum pump exhausts all air from the equipment to be charged. Valve 3 is then closed and valve 4 opened and the refrigerant charge in the auxiliary drum flows rapidly into the equipment to be charged because of the deep vacuum drawn on this equipment.

MOTOR Service

Connecting Diagrams for Lap Wound Motors

Part 5

By A. C. Roe

Railway Motor Engineer
Westinghouse Electric & Mfg. Co.

THIS month we are presenting the first of the six-pole motor connecting diagrams. These are Figs. 13, 14 and 15 and are all series connections, arranged for dual voltage connections, or for use as standard four and three lead, single voltage windings.

All of the two-phase, six-pole windings have twelve pole phase groups, as shown in Fig. 13. Each phase contains six pole phase groups; or one phase has all odd numbered groups, as A1 to A2 in Fig. 13; and the other, all even numbered groups as B1 to B2, Fig. 13. This division of pole phase groups into two equal sections makes it possible to connect the windings of two-phase motors on each side of the frame.

Such a two phase winding, with a phase connected on each side of the frame, is shown in Fig. B. This type of connection requires the use of right hand and left hand stator coils, as shown in Fig. B. Half of the coils are made with the leads at one end, and the other half of the coils have the leads on the opposite end.

The "hand" of a stator or rotor coil is determined by the location of the top half of the coil. On facing the connection end of the winding, if the top coil half is on the left, the coil is termed "left hand"; if on the right, it is a "right hand" coil. Thus the base for "hand" determination is the coil in place on the core.

In all of the two- and three-phase connecting diagrams in this series, small directional arrows are used on each pole phase group. Likewise a directional arrow is also used on each line lead. On the three phase diagrams, the arrows on adjacent groups point in opposite directions, whereas on two-phase diagrams the arrows on two groups form one pole by pointing in the same direction as groups 1 and 2, 3 and 4, 5 and 6, etc., Fig. 13.

The arrows are used mainly for the purpose of checking the winding layout to the flow of a direct current. That is, by assuming that the A1 and B1 are positive leads from which current will flow into and through the winding, we can then layout and check any two-phase winding.

Thus with two-phase windings, we have what is termed the "two in and two out" check. That is, current flows in on A1 and B1, and out on the A2 and B2 leads, as shown in Fig. 13 by the directional arrows. Next we select any two adjacent pole phase groups and use the first one as group Number 1, and the second as group Number 2, and place an arrow on each, pointing from left to right or clockwise. Then mark the top of group 1 as A1, and the top of group 2 as B1.

The next step is to proceed around the diagram and mark the next two pole phase groups with arrows that point in an opposite direction to the first two groups, so that two groups form one pole, and the next two a pole of opposite polarity, as shown in Fig. 13.

Thus to construct any two-phase diagram, we first make as many small circular arcs as there are pole phase groups; number them from one up in a clockwise direction; then select two groups, at the top preferably or wherever we want the line leads to be located, and use these as groups 1 and 2 on which to start the A and B phase.

Next, we connect pole phase groups that are pitched 1 and 3 apart together with jumpers that will continue the directional flow indicated by the arrows. We should proceed in a clockwise direction around the winding when applying the jumpers.

We know that every third pole phase group belongs in the same phase and that we should go through each group in an opposite direction. Thus if we leave one group on a bottom lead we should enter the next group on a bottom lead, as in group 1 and 3, 5 and 7, 9 and 11, Fig. 13. Or if we leave a group on a top lead we must enter the next group, spaced 1 and 3 groups apart, on a top lead, as in groups 3 and 5, 7 and 9 in Fig. 13.

The foregoing provides a simple mechanical check for any two-phase winding and permits one to construct a two-phase series connection for any number of poles. To make a parallel connection, divide the number of groups per phase by the number of parallel circuits required, and at the end of each such numbers of groups, use the A2 and B2 symbols.

For example, consider a six-pole,

(*Continued on page* 36)

●

THIS is the fifth article in a series that will present 45 modern connecting diagrams for two- and three-phase lap wound induction motors for use on four-, six-, and eight-pole windings.

A master table of the 45 diagrams was presented in the July 1939 issue together with the first three diagrams of the series. Three additional diagrams have appeared in each succeeding issue. Figures 13, 14 and 15 appear in this article together with additional explanation of the construction and use of the wiring diagrams.

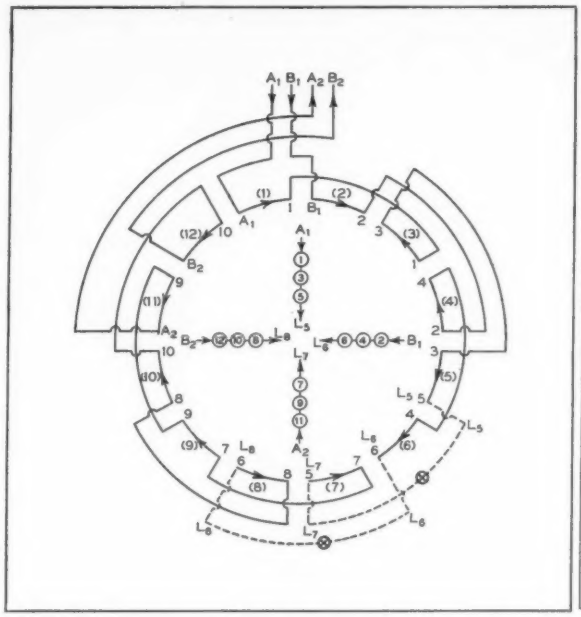


Fig. 13. Diagram for 6-pole, 2-phase with 4 or 8 leads for series or parallel connection. For 8 leads bring out A_1, A_2, L_5 and L_7 for A-phase; and B_1, B_2, L_6 and L_8 for B-phase. For series connection, connect A_1 and A_2 to A-phase lines; connect B_1 and B_2 to B-phase lines; connect L_5 and L_7 together; and connect L_6 and L_8 together. For parallel connection, connect A_1 and L_7 to A_1 line; connect B_1 and B_8 to B_1 line; connect A_2 and L_5 to A_2 line; and connect B_2 and L_6 to B_2 line. Dotted lines in diagram show series connection.

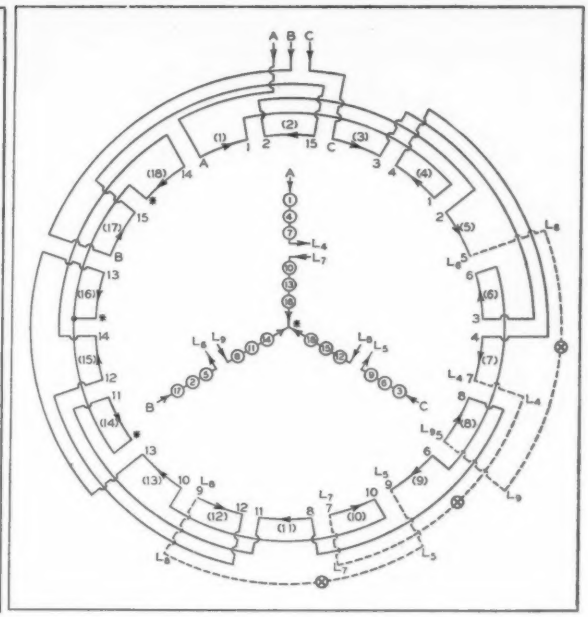


Fig. 14. Diagram for 6-pole, 3-phase with 3 or 9 leads for series star or parallel star connection. Bring out 9 leads: A, L_4 and L_7 for A-phase; B, L_6 and L_9 for B-phase; and C, L_5 and L_8 for C-phase. For series star connection, connect A, B and C to lines; connect L_4 and L_7 together; connect L_5 and L_8 together; and connect L_6 and L_9 together. For parallel star connection, connect A and L_7 to A line; connect C and L_8 to C line; connect B and L_9 to B line; and connect L_4, L_5 and L_6 together. Dotted lines show series star connection.

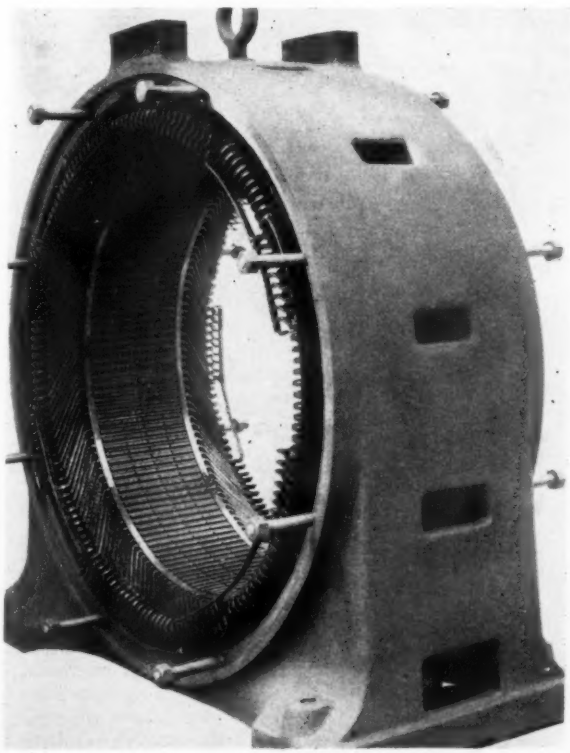


Fig. B. A Sarge 2-phase motor wound with both right and left hand coils. Note that one phase is connected on each side of the winding.

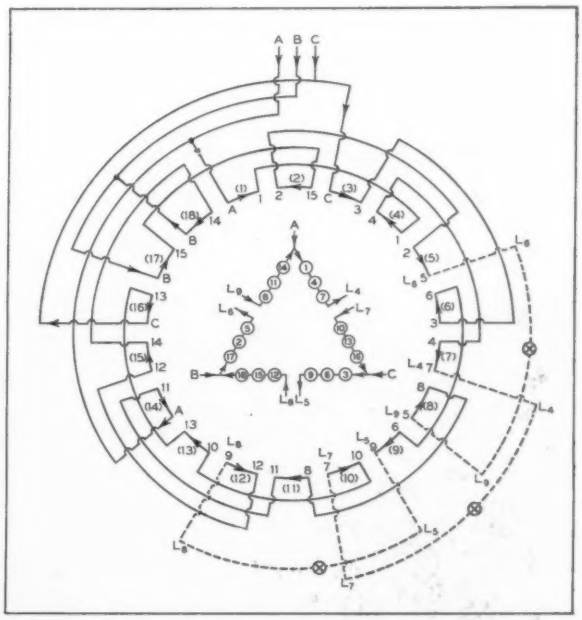


Fig. 15. Diagram for 6-pole, 3-phase with 3 or 9 leads for series delta or parallel delta connection. Bring out 9 leads: A, L_4 and L_7 for A-phase; C, L_5 and L_8 for C-phase; and B, L_6 and L_9 for B-phase. For series delta connection, connect A, B and C to lines; connect L_4 and L_7 together; connect L_5 and L_8 together; and connect L_6 and L_9 together. For parallel delta connection, connect A, L_7 and L_6 to A line; connect C, L_8 and L_4 to C line; and connect B, L_9 and L_5 to B line. Dotted lines in diagram show series delta connection.

Proper Handling Of Refrigerants

(*Continued from page* 21)

gram for handling refrigerants requires that the large supply drum be suspended from the ceiling of the shop by means of a cradle made of strap iron to which is attached a rope. The rope provides a means of lowering or raising the drum by means of a pulley and eye bolt anchored to the joist or beam in the ceiling. By inverting the drum and providing a means of raising it, the service engineer is assured a liquid supply with a gravity flow to the charging connection.

The charging connection, as shown in the diagram, is simply a set of manifold valves, each valve being used to isolate some part of the charging system during the charging operation.

The method of using the equipment is more or less self-explanatory in the diagram but some additional explanation may be desirable. The scales are placed near the supply drum and the service drum, or equipment to be charged, is placed on the scales. An adjustable weight should be connected to the scale beam in order to offset the weight of the service drum or the weight of the equipment to be charged. Naturally all lines between the scales and the stationary equipment should be flexible, such as the flexible charging hoses that are now available from the distributors.

This method is somewhat cumbersome because it is not always easy to mount the equipment to be charged on the scales. Then there is also a greater possibility of an error being made when adding gas because of the correction necessary to the scale beam. If the scales can be utilized entirely for the refrigerant charging equipment, a much better method of charging can be developed by using an auxiliary drum as a permanent part of the scales.

This plan requires that the drum be inverted and mounted in a cradle bolted to the platform of the scales. The weight of the drum and cradle is then balanced on the scales at "zero" by adding the necessary counterweight to the end of the calibrated scale beam. This method makes it possible to read the scales directly in actual pounds of refrigerant in the auxiliary drum.

The use of an auxiliary drum mounted permanently on the scales also facilitates the handling of the refrigerant inasmuch as it is more easily adapted to the charging manifold. The safety plug should be removed from the bottom of the auxiliary cylinder (located at the top since the drum is inverted) and in its place is installed a small pipe fitting so that a flexible line can be extended through a cut-off valve to a purging line which is usually extended to the top of the building for purging purposes.

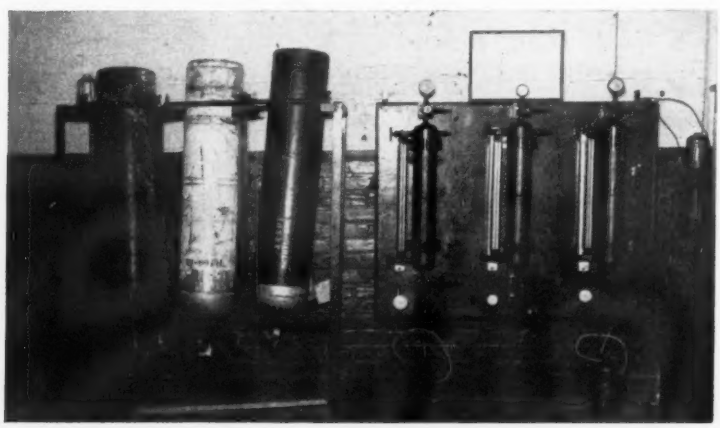
Referring to the diagram, this arrangement simplifies the filling of the auxiliary cylinder or any part of it by simply opening the main valves 1 and 4 between the supply tank and the auxiliary drum. The filling of the auxiliary drum can be accelerated as desired by slightly opening valve No. 5 between the auxiliary drum and the purge line.

In charging a sealed unit from a service cylinder, the amount of refrigerant should be measured accurately. The elimination of guess work will greatly facilitate such operations.

It is to be observed in the diagram that this plan makes use of a vacuum pump. The vacuum pump can be easily constructed from an old discarded domestic refrigerator compressor. The low side or suction line of the compressor is connected to the manifold through one of the hand valves, No. 3, and the high side or discharge of the vacuum pump is connected to the purge line mentioned previously. A check valve is installed in the compressor discharge line between the compressor and the point where the line from the auxiliary drum connects to the purge line. This check valve prevents any condensed refrigerant or gas, flowing from the auxiliary drum, from entering the compressor.

Of course, the real function of the vacuum pump is to completely evacuate drums or equipment of air and gas before charging them. This evacuation is accomplished by closing valves No. 1 and 4 and opening valves No. 2 and No. 3.

(*Continued on page* 38)



The refrigerant charging system shown here will prove an asset to any service firm. Supply drums are mounted on the rack on the left while three units for three different refrigerants are shown on the charging board. A calibrated gauge glass at the left of each auxiliary charging drum permits accurate measurement of refrigrant into service drums.

NEWS of the INDUSTRY

Utilities

Steam Plant Project Announced for Georgia

Immediate construction of a $4,000,000 electric generating plant at Macon by the Georgia Power Company was announced recently by Preston S. Arkwright, president. The plant will be operated by steam and will have a capacity of 60,000 horse power. It will be the second largest steam-operated generating station in Georgia and will be capable of producing 1,000,000 kilowatt hours a day when it is completed in 1941.

Decision to go ahead immediately with the plant was due, Mr. Arkwright said, partly to the recent settlement between the Tennessee Valley Authority and the Commonwealth and Southern Corporation. In recent years the steady increase in demand on the company's system has pointed to the need for additional generating capacity. With the threat of competition by the federal government removed or diminished, he said that the company was now able to proceed with construction plans which it had previously been forced to postpone.

The $4,000,000 plant will be the largest single construction project the company has undertaken since 1930. Although it will serve the entire state, location of the plant in Macon was decided upon, Mr. Arkwright said, because of the rapidly-growing power requirements of Middle and South Georgia, which have increased from 190,000,000 kilowatt hours in 1930 to 400,000,000 kilowatt hours in 1939. The Macon location will also have the advantage of giving that section of the state additional protection against possible interruptions of service. Three high-voltage transmission lines now bring power into Macon from three directions, and the new project will place one of the company's major generating stations at the center of this important area.

The new generating station will be generally similar in appearance and design to Plant Atkinson, the company's 100,000 horse power station near Atlanta, but will be even more modern. The boiler will be the largest ever installed in a power plant in the South and will be equivalent in height to a 10-story office building. The plant's output will be produced by a huge turbogenerator operated by a single boiler. The plant is designed for eventual addition of two similar generating units of equal size. It is to be equipped for the use interchangeably of coal, natural gas or oil. The efficiency of the new plant will be about 10 per cent better than that of Plant Atkinson, less than one pound of coal being required to produce a kilowatt hour.

Death Claims Texas Utility President

Charles W. Davis, president of Dallas Power and Light Company, of Dallas, Texas, died in a Dallas hospital September 16th from a heart attack which he suffered in his home a few days previously.

Mr. Davis was a pioneer Texas utility man, having come to Texas in 1897 to supervise the installation of a steam engine and dynamo in the first domestic light plant in the state, at Palestine. He was born in Sandusky, Ohio, Nov. 10, 1874.

He had been connected with the following electrical companies, previous to his association with the Dallas Power and Light Company; Brush Electric Co., Baltimore; Westinghouse Electric Co., Baltimore; Fort Wayne Electric Co., Fort Wayne, Ind.; Chicago Edison Co., Sandusky, O.; and the Warren Electric Co., Sandusky.

It was while working for the Warren company that Mr. Davis was sent to Palestine, Texas. The man for whom he installed the plant persuaded him to remain in Texas. He left Palestine to join the Southwestern Electric Engineering Co., at Dallas; then, after a short time with Westinghouse, joined Dallas Power and Light Co. in 1919 as vice president and general manager, being elected president in 1930.

Mr. Davis was a leader in civic work, was active in Masonic work, and a member of several Dallas social clubs.

REA Opens Drive for 100,000 Co-op Members

The Rural Electrification Administration will start a drive in November to sign up 100,000 new members on existing cooperative lines, organizing campaigns for periods of 1 to 3 months on 170 projects.

The 100,000 prospects represent the total number of non-users on existing projects. The users on

This group of electrical jobbers met recently with Florida Public Service Company sales executives at Orlando to prepare plans for local participation in the Modern Kitchen Bureau's fall range campaign. B. F. Weadock, Jr., MKB field representative, fifth from right, was the principal speaker.

the projects number 340,000. New membership committees will be set up on each project and will organize campaigns in which present users will receive prizes in the form of small appliances for bringing in new members. REA officials believe the campaign should net 50,000 new members.

The membership drive marks a lull in REA spending for the next nine months. REA has spent $40,000,000 during the past three months and has only $5,000,000 to last out the fiscal year ending July 1, 1940 unless augmented by a special congressional appropriation. The $5,000,000 will be used largely for transformers and service drops in connection with the membership campaign.

In advising dealers of the market for appliances which may be expected to develop from the membership drive, REA reveals that recent surveys have shown that there is an important follow-up market during the second six months of new user service. Heretofore, REA appliance purchase surveys have given emphasis to sales during the first six months which during the past year have averaged $200 per customer. New studies show that the second half of the first year is also substantially productive and should be given consideration in the plans of every dealer who is active in sales promotion on rural cooperative projects.

New Steam Plant For Virginia

Representatives of the Virginia Public Service Company have obtained a charter from the Virginia corporation commission for the Virginia Public Service Generating Company, which will finance and erect a new $2,000,000 steam generating station of 15,000 kilowatt capacity at Alexandria.

The charter, which fixed the maximum capital stock at $500,000 and the minimum at $1,000, listed the same officers and directors as those of the Virginia Public Service Company. All the stock will be common, with a par value of $100 a share.

M. J. O'Connell, president of the Virginia Public Service Company, and also of the new company, said in a statement released in connection with the issuance of the charter that the new plant would be erected on a site adjoining the present Alexandria generating plant of the Virginia Public Service Company.

Mr. O'Connell said a $750,000 addition to the Alexandria plant was made three years ago.

Sales Executives Meet in Atlanta

The annual fall meeting of the sales section, Southeastern Electric Exchange, was held at the Henry Grady Hotel, Atlanta, Georgia, November 2-4.

The first day of the conference was devoted to group meetings comprising the work of the various committees of the sections. These included meetings of the merchandising, rural electrification, lighting, industrial power, and advertising and sales promotion committees.

An executive sales conference for all groups was held Friday and Saturday morning with R. B. Roberts, chairman of the section, presiding. Among the subjects and speakers presented at these sessions were: "Dealer Sales Development Program," by S. P. Vecker, general sales manager, Carolina Power and Light Company; "Policies for Extending Rural Lines and Plans for Increasing the Usage Among Rural and Farm Customers," by Wells M. Stanley, vice-president, Alabama Power Company; "Value of Selective Selling," by W. J. Amoss, general sales manager, New Orleans Public Service, Inc.; "Effective Speech in Selling," by Henry N. Cassell, southeastern representative, Dale Carnegie Institute.

"All Service Commercial Mass Selling," A. G. Garrigues, director retail sales, Philadelphia Electric Company; "New Load From New Houses," C. W. Stuart, manager, Home Bureau, General Electric Company; "Market Research and Analyses," R. H. Fite, Jr., head of sales department, Ebasco Services, Inc.

"Standardization of Water Heating Equipment," W. F. Ogden, commercial engineer, Edison General Electric Appliance Company; "Advertising Advantages of Central Station Power," E. M. Clapp, manager power sales division, Georgia Power Company; and "Sales Department, an Ace Aid to Customer Relations," W. A. Moore, vice-president, Mississippi Power and Light Company.

Dealers

Three-Year Credit Terms Worry Retail Men

Re-introduction of 36 month credit terms on major appliances by two leading sales finance companies recently has resulted in a general feeling of apprehension on the part of department and specialty store credit executives who fear the step may encourage an unwise liberalization of credit terms on installment selling lines generally, according to the Credit Management Division of the National Retail Dry Goods Association.

In its newest service publication to member stores of the N.R.D.G.A., *Credit Currents*, the Credit Management Division cited the common belief among credit executives that the only time an extension of terms is justified is during a period of declining sales or generally depressed business conditions when such terms might be effective.

"In view of present improved business conditions, such lengthening of terms at this time is considered as unwise as it is unwarranted," J. Anton Hagios, manager of the Division, pointed out. "If anything, current credit policy should call for maximum terms of 24 to 30 months at the most, and as conditions improved, this maximum might gradually even be restricted somewhat more in order to provide slack for possible future liberalization of terms, so as to equalize sales during the next period of declining business activity."

Thirty-six months terms have not been in effect since the expiration of F.H.A. Title I terms, according to the N.R.D.G.A. credit division. During the period those terms were in force, the leading associations in the consumer credit field, it was pointed out, joined in expressing the view the F.H.A. terms were excessive, a belief which has since been substantiated. These organizations included the National Association of Sales Finance Companies, the National Retail Furniture Association, the National Retail Credit Association, and the N.R.D.G.A.

"The disastrous effect of lengthening terms unduly was clearly

borne out by the repossession experience of a nationally known installment operator," the Credit Management Division asserted. "This company averaged two repossessions out of every 100 units sold on terms of 20% down and 24 months credit. The number of repossessions doubled when the down payment was cut to 10% and the terms extended to 30 months. In fact, when this company extended terms to 36 months, the repossession rate jumped so phenomenally that it was five to seven times greater than when terms of 20% down and 24 months were in force. Certainly no more effective argument than this can be cited against the undue lengthening of installment terms."

The claim of the sales finance companies which have extended terms to 36 months that they acted in response to a widespread consumer demand for more liberal terms, was countered by the Credit Management Division with the assertion that credit executives in department stores report that over 80% of their customers buying major appliances use 12 to 18 months terms, although more liberal terms are available to them.

Salesmen Go to School In Washington, D. C.

The Electric Institute of Washington is experimenting with a plan by which it is hoped to show that salesmen will seek sales training voluntarily when convinced that there is something new to learn and that they will not be subjected to warmed-over information carelessly organized and inexpertly presented.

The experiment is a sales "clinic," conducted by a salaried director who combines years of experience in university education with a background of selling, from doorbell pushing to managing salesmen for electric appliance distributors and retailers.

The clinic opened recently with a registration of 250 salesmen from the Washington area. It will continue for 10 weeks, one lecture each week.

Idea of a school developed from evidence of increased turnover in salesmen and the fact that few of them were making a respectable living.

"We hope to demonstrate that the answer to increased sales and profits is better salesmen," says Jack Bartlett, manager of the Institute. "Of course, there is nothing new in that but we believe we have a new idea in the school which offers, not just another sales training course and a rehash of fundamentals as they have been presented for the past 20 years, but new subject matter scientifically organized and presented."

The outline of the course includes the following subjects: Salesmanship in 1939, a Psychological Preview, What is the Nature of the Customer? Applying what We Know about the Customer, An Analysis of Selling Procedure, Preparing to Sell, Technique in Presentation and Demonstration, Terminating the Sale: the After-Sale, Our Use of Time, and What do We Know about the Sales Personality?

Attic Fan Sales Doubled in New Orleans

Attic ventilation and window fan sales in New Orleans have shown considerable gains in 1939, doubling the 1938 figures in several instances under the persistent sales appeals published by the utility company, joint dealer advertising and individual dealer campaigns.

Total sales of attic vent fans from January 1 to August 31, 1939, were even 800 compared with 363 for the same period of 1938, and window box fans in the same 1939 period were 622, against 343 in the same months of 1938.

Breakfast meetings were a feature of the summer campaign. Salesmen would meet at a downtown New Orleans hotel at 7 A.M. and start the day's work with spirited talks and sales suggestions by leaders of large concerns. They were supplied with a large number of leads obtained in the early drive.

One or more advertisements were published weekly and tied in with an electric rate reduction which went into effect in New Orleans July 1. These generally stressed the value of electricity in the home and the economy of its use with the reduction. This was varied with a series which included a coupon which was worth $1 toward purchase of electrical equipment at any dealers. It was followed up with delivery to all homes of an envelope containing an attractive folder showing useful and economical electrical gifts.

New Firms, New Stores, and New Lines—

The Electric and Supply Company of Florence, S. C., has just moved into a new and spacious home at 209 West Evans Street. The company handles a wide range of household electrical appliances.

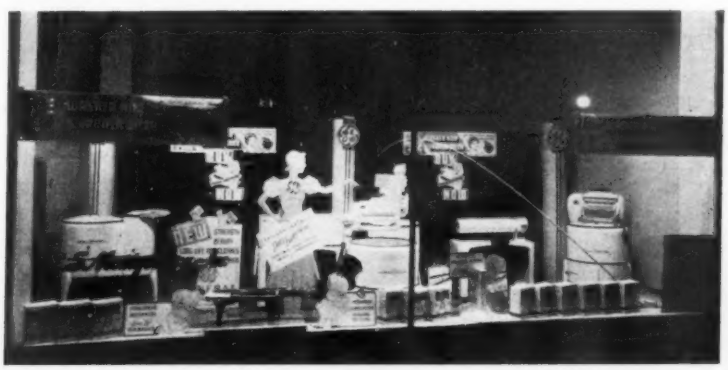
This company has enjoyed considerable growth since it was first organized in 1935. It is headed by H. R. Brown, president and manager.

* * *

E. G. Barrow Electric Company, of Delray Beach, Fla., has just moved into a new location in the Love Building on Fourth Avenue. The company handles the Westinghouse line of electrical appliances and Zenith radios.

* * *

Silkensen & Co., Frigidaire dealers of Galveston, Texas, held open house all during the first week of October in observance of the completion of remodeling work to the



This action display proved to be one of the most effective traffic stoppers ever used by R. S. Montgomery, Inc., of Richmond, Va. A towel dangled in the washer tub from the end of a bamboo fishing pole line. As the washer swirled the towel around the tub, it caused the fishing rod to jerk up and down as though a "whopper" were on the line.

firm's new store at 412 - 23rd Street.

Headed by L. L. Silkensen, this company handles Frigidaire refrigerators and ranges, Chambers gas ranges, Maytag washing machines and White sewing machines.

* * *

The Denham Electric Company, of Shawnee, Okla., located for many years on East Main Street has moved to North Broadway. The new store has been remodeled and provides a very attractive and convenient display room.

* * *

Payne Electric Shop is the name of a new firm opening at Tipton, Okla., under the management of C. O. Payne. The company will stock a complete line of electrical appliances and supplies.

* * *

Kingsport Electric, Inc., identified with the electrical field of Kingsport for many years, has purchased the building formerly occupied by the Kingsport Laundry Company at the intersection of East Market and Commerce Streets. The building will be completely remodeled and will become new quarters for the firm in the very near future.

* * *

Louis E. Allen, formerly of Gainesville, Ga., has opened an electrical appliance store in Toccoa, Ga., on Doyle Street. The company will feature small electrical appliances as well as major home appliances. General Electric, Westinghouse and RCA appliances will be handled.

* * *

The Southern Electric Company of Tallahassee, Fla., has moved into new quarters at 123 North Monroe Street. The Southern Electric Company recently received its appointment as dealer for General Electric electrical appliances. A complete air conditioning and heating service is also available from this firm headed by J. M. Feinberg.

* * *

W. H. Smith announced that he has purchased the interest of W. J. Evins in the Evins-Smith Electric Shop, of Smithville, Tenn. The firm will operate in the future under the name Smith's Electric Shop. Mr. Smith has taken over appliances and electrical supplies formerly carried by the Tennessee Electric Power Company.

* * *

The Putzel Electric Company formerly located at 519 Cherry Street, Macon, Ga., is now established in its new home at 420 Second Street. This firm, which has served the Macon public for the past forty-five years, presents an interesting display of fixtures and appliances in its new quarters.

In addition to its fixture and appliance business, the company also operates an electrical contracting department. Personnel of the Putzel Electric Company include: Isadore Putzel, president; L. Lawrence Putzel, in charge of sales department; Cleo Matthew, foreman of contracting department; James C. Swaim, office manager; and Irvin Putzel, salesman.

Contractors

Georgia Contractor Honored by Award

Ralph M. Walker, president of the Walker Electrical Company of Atlanta, Ga., was the recipient of the McGraw Contractor-Dealers Medal for 1939. The award was made in recognition of his contribution to the advancement of the contracting branch of the electrical industry, through his long and consistent promotion of a better understanding among electrical men of the principles underlying fair trade policy and the practical benefits of fair dealing.

The citation accompanying the award points out that Mr. Walker became convinced, some years ago, that the greatest obstacle to progress and prosperity in the electrical industry lay in the too common neglect of fair trade policy. This neglect, he believed, came not from deliberate indifference as much as from a lack of understanding among electrical men of the simple underlying principles which must govern business conduct, if harmony and cooperation are to prevail within an industry.

In a paper before the annual convention of the National Electrical Contractors Association in 1935, he presented his philosophy of fair dealing. He became chairman of the NECA trade policy committee and developed a "code of buying ethics" for electrical contractors that offers them a practical guide in their relations with electrical wholesalers, manufacturers and power companies, as well as their other business contacts.

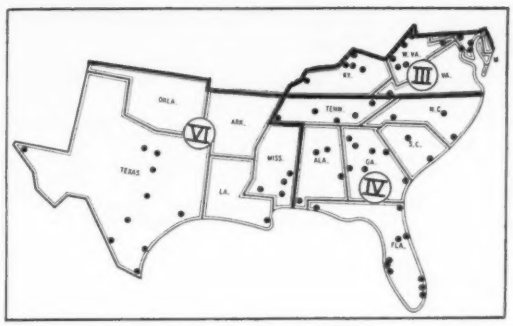
The citation points out further that Mr. Walker has continued to expound and advocate these principles at subsequent industry conventions and meetings and to support them with the fine example of his own conduct, until he has become the outstanding champion of fair trade policy in the electrical industry. By his writings, his speeches and his conferences with local and regional leaders of electrical progress throughout this country, says the citation, he has so stimulated thought and crystallized opinion that the cause of fair dealing has been greatly furthered and strengthened.

Tennessee Electrical Workers Sponsor Statewide Code

The Tennessee State Electrical Workers Association, composed of officials and delegates from each of the International Brotherhood of Electrical Workers locals in Tennessee, is preparing plans for establishing a statewide code for electrical work, according to the association's president, Clayton Miller.

Mr. Miller, who is business manager of the Memphis local, presided over the recent meeting in Chattanooga of the state associa-

Ralph M. Walker accepts the McGraw Electrical Contractor-Dealers Award from Earl Whitehorne, editor Electrical Contracting magazine. The presentation was made at the recent NECA convention in Philadelphia. Left to right, Mr. Whitehorne, Mr. Walker and K. D. White, associated with Mr. Walker in the White Electrical Construction Company



Local housing authorities now have more than 143 projects under loan contracts in the third, fourth and sixth regions of the United States Housing Authority. Each dot on the map above represents a local authority with one or more projects under loan contract.

tion. Lengthy data on state electrical codes and regulations were reviewed at the business meeting and plans were made for compiling further statistics and information with the view of establishing a statewide code for electrical work.

Slum Clearance Loans Approved

Slum clearance in the United States advanced another long stride when President Roosevelt, upon recommendation of Nathan Straus, administrator of the United States Housing Authority, approved additional loans to local communities totaling $30,026,000, and brought the total number of low-rent housing projects to 299, costing in excess of half a billion dollars.

These new loans, to defray 90% of the $33,376,000 estimated cost of 27 low-rent and slum clearance projects in 13 cities, brought the USHA loan contract total to $522,633,000. In addition to this amount in loan contracts, there are outstanding earmarkings of $142,100,000, making a total of $664,793,000 in USHA commitments for 157 communities.

The largest loan contract approved in the last group was $6,886,000 to Houston, Texas, for construction of five additional slum clearance and low-rent projects which will provide about 1,866 dwellings for low-income families of that city.

A total of 143 projects are now under loan contract in the southern and southwestern states comprising the third, fourth and sixth regional districts of the USHA. Total commitments for projects in these districts now approximate $218,459,000.

Associations

Georgia Chapter, IES Receives Charter

Nearly a hundred members and guests are expected to attend the first meeting of the Georgia Chapter, Illuminating Engineering Society, since it received its charter in September. With Roy A. Palmer, illuminating engineer, Duke Power Company, scheduled as the principal speaker, the group will meet November 2 at the Henry Grady Hotel, Atlanta.

Although lighting engineers of Georgia had organized a lighting club some time ago, this group was not chartered as a chapter of the IES until September 26 at a special meeting held in Atlanta. In attendance at this meeting was James M. Ketch, General Electric Company, Nela Park, who was designated by the IES Council to present the charter. Mr. Ketch was introduced by Philip Peeples, manager lighting division, Georgia Power Company.

Officers of the new chapter include Charles H. Burch, Curtis Lighting Company, Atlanta, chairman; James F. Whitehead, Jr., Georgia Power Company, Atlanta, secretary-treasurer; and the following board of directors: Ivar H. Stockel, Benjamin Electric Manufacturing Company; Hal M. Horton, General Electric Company; and W. W. Wildeman, Westinghouse Electric & Manufacturing Company; all of Atlanta.

At the speakers table were C. H. Burch, chairman of the Ga. Chapter; James M. Ketch, who presented the charter; Phillip Peeples and H. M. Horton.

League Association Holds Conference

G. W. Weston, secretary-manager of the Electric Association of Kansas City, Mo., was elected president of the International Association of Electrical Leagues for 1940 at the Fourth Annual Conference, held at the headquarters of the Electrical & Gas Association of New York early in October. J. S. Bartlett, managing director of the Electric Institute of Washington, D. C., was elected vice president and Carl H. Christine, secretary-manager of the St. Louis Electrical Board of Trade, St. Louis, Mo., was elected treasurer. O. C. Small and J. F. Biggi were re-appointed secretary and assistant secretary, respectively. In addition to Messrs. Weston, Bartlett and Christine, the Board of Governors for the ensuing year will comprise John Morrison, managing director, Electrical Association of Philadelphia; E. P. Zachman, business manager, Cincinnati Electrical Association; E. J. Strong, manager, Electrical League of Utah; G. W. Austen, manager, Electric Service League, Inc., Toronto; G. H. Nickerson, manager, Electric League of Pittsburgh; H. P. Wilson, secretary-manager, Electrical Institute of the Tri-Cities, Rock Island, Ill. Ainslie A. Gray, president of the IAEL for 1939, will be an advisory member of the Board for 1940.

The subjects presented at the open sessions covered a large sector of the industry's major interests and were discussed by acknowledged leaders. The speakers included C. W. Kellogg, president, Edison Electric Institute; M. Porosky, vice president, NEMA; J. G. Johannesen, chairman Executive Committee, National Electrical Wholesalers Association; Earl Peak, president, National Electrical Contractors Association; C. W. Horn, director of Research and Development, National Broadcasting Company; C. R. D'Olive, manager, Household Appliance Division, Stewart-Warner Corporation; W. N. Gallagher, president and general manager, Automatic Washer Company; J. R. Poteat, manager, Water Heater-Range Section, General Electric Company; H. B. Donley, manager, Household Appliance Division, Westinghouse Electric & Manufacturing Company.

Richmond Electrical League Begins Fall Activities

First fall activities of the Electrical League of Richmond was opened with a golf tournament and dinner at the Hermitage Country Club, September 21.

Directed by Billie Burke, sales manager of Tower-Binford Electric & Mfg. Company, the tournament attracted a record-breaking number of League members and their guests.

Following the dinner in the evening, the group was addressed by Sam H. Hazelton, lighting engineer, General Electric Company, who presented an interesting discussion on fluorescent and other new light sources.

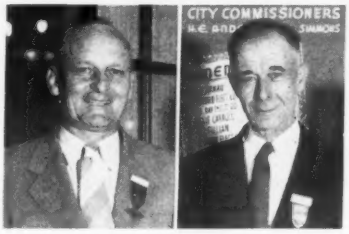
Inspectors

Southern Inspectors Named To Electrical Committee

Three well-known electrical inspectors of southern cities recently were appointed members of the Electrical Committee of the National Fire Protective Association. The group includes Dewey L. Johnson, superintendent of electrical affairs, Atlanta; Frank G. Camus, city electrician, Shreveport, La.; and C. S. Whitaker, city electrical inspector, Durham, N. C.

Dewey L. Johnson

The appointments were made by Mayor LaGuardia of New York City, and president of the U. S. Conference of Mayors. The Conference of Mayors was recently given the privilege of appointing five representatives and five alternates to the electrical committee



F. G. Camus C. S. Whitaker

by the National Fire Protective Association. Mr. Johnson was appointed to full membership; Mr. Camus and Mr. Whitaker, alternates.

These appointments are of particular interest to the electrical industry of the South because many members of the industry feel that these additional appointments are a more or less direct result of a resolution adopted by the Southern Section, IAEI, at one of its recent meetings, asking the National Fire Protective Association to give municipal and other governmental inspectors a more effective voice in the affairs of the electrical committee.

Southern Section, IAEI, Begins Membership Drive

In the first month of an intensive membership drive, members of the Southern Section, International Association of Electrical Inspectors, have submitted a number of new enrollments, according to Joseph Whitner, secretary-treasurer of the Section.

Among those members who have submitted and endorsed applications of new members during the past month are the following:

W. E. Armstrong, Underwriters' Laboratories, New York
T. W. Bowry, Richmond, Virginia
T. P. Branch, Atlanta, Georgia
Claude V. Bulls, Norfolk, Virginia
N. E. Cannady, Raleigh, N. C.
H. G. Knoderer, Bridgeport, Conn.
G. M. Miller, Richmond, Va.
J. Warner Pyles, REA, Washington, D. C.
B. Z. Segall, New Orleans, La.
W. R, Taylor, Jr., Atlanta, Ga.
Joeph Whitner, Atlanta, Ga.
W. Edward Dunn, Alexandria, Va.

Electrical and Plumbing Inspection Combined

The combining of electrical and plumbing inspection services under one head has been approved by the county commissioners of For-

syth County, North Carolina, of which Winston-Salem is the county seat.

Action to combine the electrical and plumbing inspection services under one inspector was taken upon recommendation by Dr. J. Roy Hege, county and district health officer. He pointed out that a merger of the two inspection services would result in an economy for the county.

The county board of health mapped out a tentative schedule of inspection fees. This schedule may be permanently adopted after it has been studied by the county tax department, through which offices the fees will be actually collected.

Wholesalers

General Electric Executive Receives Wholesalers Award

Louis M. Nichols, comptroller of the General Electric Supply Company, in Bridgeport, was presented with the McGraw Wholesalers Medal, recently, in recognition of his contribution to the advancement of the wholesaling branch of the electrical industry, through his comprehensive study of the cost of distributing electrical products, and his supporting counsel to the Commodity Committees of the National Electrical Wholesalers Association. Mr. Nichols was selected in May 1937 to act as chairman of a sub-committee, authorized to make a detailed national study of the operating costs of wholesaling the full range of commodity lines sold by the members of the National Electrical Wholesalers Association.

The citation accompanying the award points out that this data he compiled, analyzed and presented to the industry at the fall meeting of the association in October 1937. At great personal cost in time and energy, he has generously supported his completed committee responsibility with a continuing service that has embraced further commodity research, additional statistical compilation and analysis and uncounted conferences.

In these contacts, his broad knowledge and his intelligent expositions of these inner facts of industry experience have increased the common understanding and brought benefit to all those two wholesale electrical products.

West Texas Jobber Reports Good Business

The Equipment Engineering Company at Midland, Texas, is filling a long felt need of electrical contractors in this west Texas territory for a wholesale house nearer to them. Organized less than a year ago this company has enjoyed an increasing business each month. They have furnished all materials on several large contracts in west Texas.

J. M. Connor, formerly with General Electric Co., is sales and warehouse manager.

Some of the lines handled by them are Square D, M. B. Austin, Collyer and Clifton wire, Clifton conduit, and Moe-Bridge fixtures.

Sales Training for Dealers Boosts Jobber's Business

Since there is no electric appliance dealer association to promote cooperation within its territory, the Miami branch of Major Appliances, Inc., has assumed some of the functions of such an organization, insofar as its own dealers are concerned. As its reward, the branch has built up its sales volume in three years to within hoping distance of the million per annum mark.

Concrete results, according to Geo. D. Gray, sales manager at the Miami branch, rather than wishful thinking form the basis for the hope. During August, generally a dull month among local appliance dealers, the branch wrote onto its sales ledger the best month's business since its establishment.

Conducting a wholesale appliance business exclusively, Major Appliances, Inc., of which Walter D. Rowlands, of Miami Beach, is president, operates branches in Jacksonville and Tampa as well as in Miami.

The firm's most profitable sales activity consists of teaching its 80 dealers how to sell more merchandise at a profit. Eight specially trained salesmen instruct dealers and their sales forces in the selling points of the lines represented and in the best methods of presenting them to prospects.

Frequent "get-togethers" contribute toward a better understanding between the dealers themselves and between the dealers and the branch personnel. The year's high spot in the promotion of good fellowship is the annual birthday "jamboree," held on October 16, the date on which the branch was opened. In addition to its regular prescribed responsibilities as "host," the branch provides an attractive array of prizes, which are distributed to the winners of the inter-dealer sales contest.

This co-ordination of wholesale and retail organizations makes easier the task of educating dealers in the advantages of price stabilization. Better profits, in turn, reduce the risk of losing dealers because of their inability to make money.

Mr. Gray, who took over the sales management at the Miami branch about two years ago, was formerly southern division manager for the Kelvinator Corp. Familiar with the handling of jobber-dealer relationships and the training of a sales force, he has obtained splendid results on the Lower Florida East Coast for his firm.

MANUFACTURERS' News

Easy Distributors Learn 1940 Plans

Sweeping price reductions of between $10 and $40 and a newly-styled and simplified line of washing machines and ironers were revealed to distributors of the Easy Washing Machine Corporation at a distributors' convention held September 11 and 12 at Syracuse, New York. More than 150 men, including the company's field sales representatives and executives of over 50 distributor organizations from throughout the United States attended the meeting, which was conducted by J. J. Nance, general sales manager of the Corporation.

The reaction to the meeting was described as being the most enthusiastic in the company's history, and a sweeping spirit of optimism as to the sales volume to be experienced in the coming months as a result of the outstanding new product values and promotional program was expressed. The meeting was key-noted by thoroughgoing coordination of all factors that make for sales—product planning and promotion being described as closely geared into an all-embracing program. Chart presentations were used to get the story across to the Easy organization and new graphic demonstrations of superiority of the Easy product were convincingly presented.

It was revealed that 8 models will be featured as the basic Easy line of washers this year. These will be supplemented by other electric and gasoline washers—although the total number of models has been reduced considerably—and by a line of 4 ironers. All have been streamlined and generally restyled. All boast special long-lasting finishes and all the models in the basic line feature that exclusive Easy Spiralator washing action. The Spiralator was announced as available for the first time in a popular priced washer.

Leaders in the 1940 line include a Spindrier type washer with Spiralator action, priced at $99.95 "plus your old washer" on a national basis. This machine combines features never before offered by Easy within $40 to $50 of its new low price. It is also the lowest priced spinner type washer the company has ever placed on the market. A newly priced Spiralator wringer washer, Model 4S4, was also introduced and heralded as a means by which dealers could step low-price washer purchasers up into the medium-priced class, with consequent increase in customer satisfaction and profit.

According to J. J. Nance, general sales manager, who conducted the Syracuse convention, Easy advertising and promotion during 1940 will emphasize the advantages of the Spiralator washing method and the new advantages it brings to the user in the dollar-and-cent economy of home laundering. An expansion of the company's advertising campaign was indicated.

Walker Company Extends Atlanta Plant Facilities

Walker Electrical Company, Atlanta, announces the erection of a new branch plant off Northside Drive in Atlanta, which is now being used for the production of a complete line of outlet and switch boxes, bar hangers, clamps, lath supports, extended ears and other miscellaneous accessories for these boxes.

This marks entrance into a new field of production for the company, which already has been manufacturing lighting panels, circuit breaker panels, service entrance switches, pullout and safety switches, motor testing devices, cutout and junction boxes, socket metering equipment, and stud and aluminum cabinets of all kinds.

TVA Extends Westinghouse Carrier-Current System

Purchase of carrier-current communication equipment for linking the TVA dams at Wilson and Hiawassee with the existing circuits of the TVA system has been announced by the Radio Division of the Westinghouse Electric & Manufacturing Company. This equipment, specified for early 1940 delivery, will consist of two standard Westinghouse transmitter-receiver units of 150 watts power with the necessary coupling capacitors and line tuning units for one equipment. This carrier apparatus will supplement the five Westinghouse units recently installed at the project which established a new communication channel between Norris Dam, Watts Bar, Alcoa, and Chickamauga Dam.

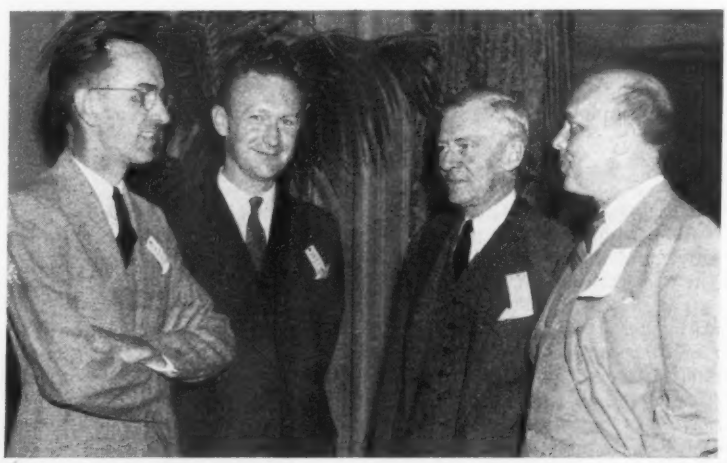
"Sweeney Day" Nets Million in Orders

After 29 years with the General Electric Company, salesman Mike Sweeney was forced to sit idly by, powerless to raise a finger, and watch more than a million and a quarter dollars worth of domestic refrigerator sales roll in and drop at his feet. It wasn't done with bonuses, with high pressure, or with mirrors—but all "for the luvva Mike." And it happened on Friday, September 29, planned as "Mike Sweeney Day" on the G-E calendar.

Mike Sweeney, manager of the G-E domestic refrigerator sales section, is known the length and breadth of the electrical appliance industry, and the special sales effort in his honor, worked out by A. L. Sanger, refrigerator sales manager, and Jean DeJen, manager of dealer service, was kept a complete secret from him until the day arrived.

National headquarters were set up in the Waldorf-Astoria in New York, and all during the day and evening telegrams and friends dropped in in a continuous stream. As a matter of fact, even the G-E dealers were not informed until the day before the drive opened.

Sanger and George Chapman, manager of G-E specialty appliance sales,



Among those representing the South at the Easy distributor convention were, left to right, W. L. McAllister, of Watts-Newsome Company, Birmingham; L. J. Mulhall, Easy Southeastern Divisional sales manager; W. N. Mason, general manager, R. F. Trant, Inc., Norfolk; A. K. Sutton, president, A. K. Sutton, Inc., Charlotte.

recorded a special message to campaign managers, announcing the plans. The disks did not arrive at their destination until September 22, and then were played by sales counsellors at a campaign meeting.

Bob Shackelford, manager of the G-E Supply Corp. in Nashville, received only one record, which he had to carry to all points in his territory by plane. Then the fireworks began, at 7 o'clock in the morning in most distributorships, with a breakfast for dealers. In many cases, distributors did not count a sale until the customer's name and address was actually filed.

Quota set for the day in advance, by headquarters, was $500,000 in retail sales list prices. The exact figure at the close of the campaign will probably never be known, but as the party at the Waldorf pulled down the blinds, the figure was standing at $1,300,000 with many places still to be heard from. Under the rules, the latter probably did not qualify in the campaign total—but orders are orders.

Okonite Executive Claimed by Death

One of the most romantic careers in the electrical industry was brought to a close when death claimed William Kemp Vanderpoel, international authority on transmission and power distribution problems, and vice president of The Okonite Company and of the Okonite-Callender Cable Company. Mr. Vanderpoel died at his home in South Orange, N. J., on October 21, after a short illness, in his 59th year.

William Kemp Vanderpoel

The wealth of experience which Mr. Vanderpoel's career embraced began with his first engagement as cadet engineer on trans-Atlantic ships. He then engaged in mining, trading and exploration work in South America, but soon turned to active participation in the electrical industry through a connection with the "Red Telefonica System" in Havana, Cuba, followed by an association with the New York and New Jersey Telephone Company. Then came a period of banking experience followed by his selection as assistant purchasing agent of the Florida East Coast Railway.

In 1907, Mr. Vanderpoel joined the Public Service Corporation of New Jersey, as division superintendent, later advanced to general superintendent of that company's entire electric distribution system.

His association with The Okonite Company began in 1926, when he was elected vice president and executive engineer.

Always foremost in any effort for the betterment of the electrical industry, Mr. Vanderpoel was an active member, committee worker and officer of leading electrical societies. He had served as manager of the American Institute of Electrical Engineers; vice chairman of the Engineering Section; chairman of the Overhead Systems Committee, and the Timber Preservative Committee of the National Electric Light Association, and member of many other committees of various engineering societies.

News About People—

Charles E. Wilson, executive vice-president of the General Electric Company, recently announced the appointment of a new committee to have responsibility for the policies and co-ordination of General Electric advertising.

Chester H. Lang of Schenectady, advertising manager of the company, is chairman of the committee and in this capacity will serve as a member of Mr. Wilson's staff in connection with advertising and publicity matters.

Other members of the committee are **B. W. Bullock,** of Bridgeport, Conn., recently named as advertising manager of the appliance and merchandise department of the company, and **H. F. Barnes,** of Cleveland, Ohio, sales promotion manager of the lamp department.

* * *

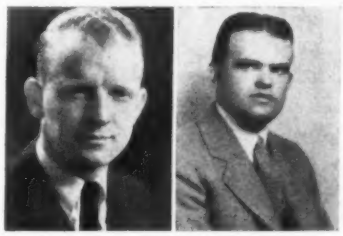
The appointment of three assistants to the manager of the General Electric publicity department was announced by C. H. Lang, manager.

W. V. Merrihue has been placed in charge of the apparatus division. Mr. Merrihue has been connected with General Electric since 1925 and has served as division manager of central station advertising since 1933.

R. L. Gibson will have charge of the general publicity division. Mr. Gibson first began work for General Electric in 1925, handling market research work. Since 1936, he has served as division manager of industrial advertising and sales promotion.

A. L. Scaife **W. V. Merrihue**

B. J. Rowan, who has been placed in charge of the administrative and production division of the publicity department, entered the testing department of the Pittsfield works of the company in 1918. After an absence of several years during which time he engaged in military service and in attendance at the Boston University, he rejoined the company, and since 1930, he has been district manager of the publicity department in New York City.



R. L. Gibson **B. J. Rowan**

* * *

A. L. Scaife, for several years in charge of the advertising and promotion of General Electric refrigerators and other products of the company's specialty appliance division at Cleveland, has been appointed assistant advertising and sales promotion manager of the G-E appliance and merchandise department, by Boyd W. Bullock, advertising manager. The appointment places Scaife specifically in charge of planning for the entire appliance line. He will make his headquarters in Bridgeport.

* * *

Three additional appointments in the newly organized advertising division of the General Electric Appliance and Merchandise Department at Bridgeport, Conn., have been announced by Boyd W. Bullock, advertising manager.

J. W. Dunbar, who for the past year and a half has acted as assistant to the advertising manager in charge of media relations, becomes supervisor of full line appliance advertising, with headquarters at Bridgeport. Mr. Dunbar was associated for many years with the advertising of General Electric incandescent lamps.

Carle B. Robbins has been appointed copy chief of the new division, and will continue as editor of "News-Graphic," the G-E appliance magazine. It was Mr. Robbins who conceived, wrote, and produced "Get Over Into Clover," the G-E appliance production which last spring toured principal cities all over the country.

K. G. Patrick has been placed in charge of press relations for the entire appliance line and will continue to make his headquarters at the General Electric Building in New York City.

* * *

D. R. Grandy, assistant sales manager in charge of advertising for G-E's Vapor Lamp Company, until its merger recently with the compa-

G. H. Smith F. B. Williams H. K. Dewees W. R. Schafer D. C. Marble

ny's Incandescent Lamp Department, has been named to head up promotion activities of electric discharge lamps for the sales promotion department of G-E's Lamp Department at Nela Park, Cleveland.

During his fifteen years with General Electric, Mr. Grandy served successively as commercial engineer with the Cooper-Hewitt Electric Co., at Hoboken, N. J., engaged in field contact work, prepared lighting layouts for large industrial plants, and directed the sales promotion and advertising programs for G-E Vapor Lamp Company.

* * *

Changes in the Hotpoint organization, effective October 1, 1939, were recently announced by **R. W. Turnbull,** vice-president and general sales manager, Edison General Electric Appliance Company, Inc.

G. H. Smith, Hotpoint refrigeration division manager, has been made general merchandising manager. His duties will include coordination of sales plans and activities of all Hotpoint product sales divisions.

Mr. Smith began his career in 1925 selling vacuum cleaners at retail, while attending Michigan State College. After holding various sales positions, Mr. Smith joined the General Electric Company in 1929 as laundry equipment specialist for Detroit.

He joined the Hotpoint Company in 1936 as manager of the home laundry division, and since 1937 has been manager of the refrigeration division.

F. B. Williams, Atlanta district manager, has been made manager of the Hotpoint refrigeration sales division with headquarters at Chicago. Mr. Williams first joined the Hotpoint Company in 1928 as appliance specialist. Previous to his appointment as Atlanta district manager in May 1937, Mr. Williams was Hotpoint range specialist for the Atlanta district and Hotpoint sales representative for Tennessee.

H. K. Dewees, Hotpoint Minneapolis district manager, has been appointed sales manager of the Atlanta district.

D. C. Marble, Hotpoint range division manager, has been appointed manager of the Hotpoint products service division, directing product service for all five Hotpoint home appliances.

W. R. Schafer, who has been with the Hotpoint Company for more than fifteen years, as commercial cooking equipment sales engineer, and later as manager of Hotpoint service, has been made manager of the Hotpoint range division.

Following his graduation from Michigan State College in 1923, Mr. Schafer took the general test course of Commonwealth Edison Company, Chicago. In 1924 he joined the Hotpoint Company as a design engineer on commercial electric cooking equipment.

* * *

George G. Whitney, for some years assistant advertising manager, Norge Division, Borg-Warner Corporation, has been appointed advertising and sales promotion manager of the Norge Division, succeeding **James A. Sterling** who was recently made general merchandise manager for all Norge products.

Mr. Whitney has had a long successful career in advertising in both the automotive and the refrigeration fields. He was formerly assistant advertising manager of the Olds Motor Works and also held a similar position with another mechanical refrigeration company.

G. G. Whitney R. B. Blanchard

Roy B. Blanchard is a new addition to the sales promotion department of Norge Division who comes to Norge from R. L. Polk & Company, with whom he has recently been associated in the field of direct mail advertising. Mr. Blanchard, who will handle sales promotion under the direction of Mr. Whitney, was also formerly associated with Buick Motor Company for twelve years as assistant advertising and sales promotion manager.

* * *

L. L. Hoover, branch manager in the Southeastern States for The Hoover Company, North Canton, Ohio, announces the appointment of **J. H. Lounsbury** as representative in charge of the sale of Norca Products and Hoover specials (previous models reconstructed in the Hoover factory).

Mr. Lounsbury will call on dealers in the southeastern states and will make his headquarters at the branch office of The Hoover Company, at 735 Spring Street, Atlanta.

* * *

Edward P. Wells has been appointed vice president and general sales manager of the Eureka Vacuum Cleaner Company, Detroit, according to announcement of **Henry W. Burritt,** Eureka president. Mr. Wells has had a wide experience in the electrical appliance and household products field, including activity in every phase of selling. Mr. Wells has been vice-president in charge of sales of the Kalamazoo Stove Company.

E. P. Wells

* * *

The New Orleans sales office and warehouse of Cutler-Hammer, Inc., in charge of **P. C. Hutchison,** recently moved to new quarters at 732 Girod Street, New Orleans.

A complete stock of Cutler-Hammer products, including motor control, safety switches, and service control items, will be carried in stock at the New Orleans quarters for quick delivery in this territory.

* * *

The opening of a new branch office in Kansas City was announced recently by **Hawkins & Hagen** Electric Sales Company, St. Louis, Mo., electrical manufacturers representatives.

Announcement has been made of the appointment of **Charles T. Lawson** as sales manager of household appliances of the Kelvinator division of Nash-Kelvinator Corporation, according to **Frank R. Pierce**, general sales manager. Until recently, Mr.

C. T. Lawson

Lawson was household sales manager of the General Motors Frigidaire Division.

In his new position, Mr. Lawson will have charge of all Kelvinator and Leonard refrigerator, electric range, electric water heater, washing machine and ironer sales.

* * *

Jack Pauls is now southeastern representative of National Stamping and Electric Works, Chicago, Ill., and is making his headquarters at 548

Jack Pauls

Church St., Decatur, Ga., a suburb of Atlanta. His territory will include Florida, Georgia, Alabama, North Carolina and South Carolina.

Universal Washer

A new Universal deluxe model washer has just been announced by Landers, Frary & Clark, New Britain, Conn. The washer has a capacity of eight pounds and is available either with or without pump.

A tub design features a deep skirt and wide stainless steel band. A strainer prevents clogging of the pump and thick rubber cushions are provided between the tub and base frame. The cover is edged with a soft cushion of rubber. The improved heavy duty agitator features greater contact area between shaft and agitator preventing wear. The long, wide and triple-vaned agitator is scientifically designed to develop both upper and lower water currents. The tub is finished with white porcelain enamel both inside and out while other enameled parts are finished in white baked enamel.

New Electric Ironer

An electric ironer that duplicates the sheen previously produced only by hand iron action is introduced as the Emperor of the 1940 ironer line by Westinghouse's Merchandising Division, Mansfield, Ohio. This sheen, giving the fabric a tailored appearance, is produced by the action of an ingenious device called a rocker that makes the roll shuttle back and forth under the shoe, corresponding to the effect of a battery of hand irons moving in unison. In addition to this hand iron action feature of the 1940 Emperor, it has an unobstructed roll with two completely open ends. These fully open ends make possible creaseless ironing and provide more

ironing space. The roll provides an ironing capacity of 24 square feet per minute.

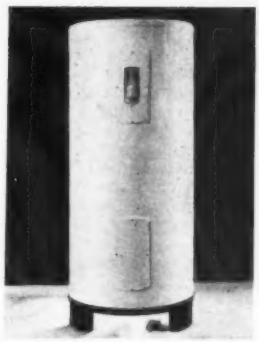
The new ironer is equipped with foot pedal control, freeing both hands from control management. A new automatic tilt switch control panel with a pilot light is concealed when not in use. When the switch box is pressed flush into the cabinet, the current is automatically turned off.

Master Water Heater

Retaining every feature of automatic operation, convenience and economical efficiency, the Edison General Electric Appliance Company, Inc., has given their new master water heater models a beauty of design unknown in an appliance of this type.

Every unnecessary seam or angle has been eliminated. The entire tank, including the top, is finished in white Calgloss, with shining black base and feet. The top's rounded edges fit smoothly over the body and front panels are absolutely smooth, without cracks or crevices to catch dust and dirt.

Utter simplicity that will blend



with any decorative scheme of basement recreation room or kitchen, marks the design of this heater. It is available in 30, 40 and 50 gallon sizes with Monel or galvanized tanks, single or twin unit type. Heating is accomplished with Calrod hairpin unit controlled by the automatic Thermosnap.

Giant Size Washer

A giant size electric washer, which will sell at a new low price and thus make this type of appliance available to many families that heretofore have been unable to afford modern home laundry equipment, is being introduced to its field organization by the Kelvinator Division of Nash-Kelvinator Corporation. The new model, which has been designated as the 79C, brings to seven the washing machines in the Kelvinator line.

Features of the new model are: large-size full 20-gallon tub; capacity for eight pounds of wash at one time; all white finish; all porcelain tub; a massive wringer big enough to handle a capacity load quickly, an end pressure reset; an automatic waterboard; balloon rolls; silent mesh transmission; and a large "Fin Flex" agitator.

Nesco Roaster Literature

To aid dealers in getting their fall electric roaster selling campaign off to a fast start, Nesco has just released new material designed to arouse consumer interest and educate sales people as well as consumers to the feature advantages of the Nesco electric roaster line.

Outstanding item is a realistic and

brilliantly colored 30" x 40" window display. It provides an ideal backdrop for a window or department roaster display. In addition, four feature cards pointing out the advantages and exclusive qualities of the Nesco deluxe roaster are available for placing in the window and around the department.

Consumer circulars tying in with the theme of the feature cards and the full color display are also offered. A broadside suggesting many uses of the sales aids and covering the features of the Nesco deluxe rectangular electric roaster and the entire Nesco line will be sent in quantity upon request. Further information about this material can be obtained free of charge by writing to the National Enameling and Stamping Co., Milwaukee, Wisconsin.

New Everhot Roaster

A new electric roaster featuring an automatic cover opener has just been announced by the Swartzbaugh Manufacturing Company, Toledo, Ohio. By turning a knob on the body, directly opposite from the knob that controls the temperature, the cover may be opened and closed.

This remote control of the cover is a safety and convenience feature that will appeal to women.

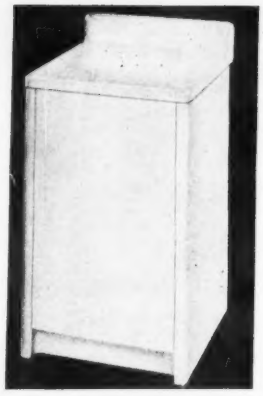
This model No. 800 Everhot electric roaster has 18 quart capacity. A choice of utensils in Glassbake, aluminum or vitrious enamel is offered.

Of additional interest is the new Everhot roaster cabinet which is sold extra, featuring a means inside the door to hold the broiler, thus conserving full shelf space for equipment or other appliances.

Table Top Water Heater

A new table top electric water heater with two heating elements is announced by the Frigidaire Division, General Motors Sales Corporation. The new water heater will have a 30 gallon galvanized tank of copper-bearing steel, electrically welded. A white Dulux finished steel cabinet encloses the tank and a stainless porcelain top provides additional work space when the heater is installed in the kitchen. The base is recessed to provide ample toe room.

Heating units are of the immersion type for rapid transmission of heat directly into the water, and water



temperature is automatically controlled with immersion type hydraulic thermostats of double-pole construction with silver contacts of the durable quick make-and-break type.

New Washer Sales Help

A brand-new laundry hamper, designed by people who understand home laundry needs, is announced by the Hotpoint home laundry division.

Standing 33 inches from the floor, and measuring 13½ inches square, the body of this attractive hamper is made of a white wicker material, with smooth, marbelized top of Pearliwick.

Held firmly in position by tabs and snaps around the body rim, the fish-net-type laundry bag with a heavy drawstring, hangs inside the frame.

When filled with soiled clothes it can easily be unsnapped and lifted out of the frame, pulled tight, by the drawstring, and deposited, clothes and all, in the laundry, while another bag is hung in the hamper for the next load.

These hampers are being made available only to retailers of Hotpoint home laundry equipment, by the Edison General Electric Appliance Co., Inc., Chicago.

STATEMENT OF THE OWNERSHIP, MANAGEMENT, CIRCULATION, ETC., REQUIRED BY THE ACT OF CONGRESS OF AUG. 24, 1912, AND MARCH 3, 1933

Of Electrical South, published monthly at Marietta, for October 1, 1938.

State of Georgia, County of Fulton.

Before me, a Notary Public in and for the State and County aforesaid, personally appeared J. C. Martin, who, having been duly sworn according to law, deposes and says that he is the Business Manager of the Electrical South, and that the following is, to the best of his knowledge and belief, a true statement of the ownership, management, etc., of the aforesaid publication, for the date shown in the above caption required by the Act of August 24, 1912, as amended by Act of March 3, 1933, embodied in Section 537, Postal Laws and Regulations, printed on the reverse side of this form, to-wit:

1. That the names and addresses of the publisher, editor and business manager are:
Publisher, W. R. C. Smith Publishing Co., Atlanta, Ga.
Editor, Carl W. Evans, Atlanta, Ga.
Business Manager, J. C. Martin, Atlanta, Ga.

2. That the owners are:
W. R. C. Smith Publishing Co., Atlanta, Ga.; W. R. C. Smith, Atlanta, Ga.; J. C. Martin, Atlanta, Ga.; O. A. Sharpless, Atlanta, Ga.; T. W. McAllister, Atlanta, Ga.; W. J. Rooke, Atlanta, Ga.; W. S. Cushion, Cleveland, Ohio; E. W. O'Brien, Atlanta, Ga.; J. C. Cook, Chicago, Ill.

3. That the known bondholders, mortgagees and other security holders, owning or holding 1 per cent or more of total amount of bonds, mortgages, or other securities are: None.

4. That the two paragraphs next above giving the names of the owners, stockholders, and security holders, if any, contain not only the list of stockholders and security company but also in cases where the stockholders or security holders appear upon the books of the company as trustees or in any other fiduciary relation, the name of the person or corporation for whom such trustee is acting, is given; also that the said two paragraphs contain statements embracing affiant's full knowledge and belief as to the circumstances and conditions under which stockholders and security holders who do not appear upon the books of the company, as trustee hold stock and securities in a capacity other than that of a bona fide owner; and this affiant has no reason to believe that any other person, association, or corporation has any interest, direct or indirect, in the said stock, bonds, or other securities than so stated by him.

J. C. MARTIN,
Business Manager.

Sworn to and subscribed before me this 19th day of September, 1939.

E. L. PHILPOT,
Notary Public at Large.
My commission expires Feb., 7, 1943.

Connecting Diagrams For Lap-Wound Motors

(*Continued from page* 22)

two-phase, two parallel connection. We have six divided by two, or three groups in series in each parallel leg. Then we start at group 1 on A1 and proceed through three groups as 1, 3 and 5, and at the end or bottom of group 5 we would place A2, then at the bottom of group seven we would place an A1 to start the second leg of the parallel circuit. This second leg would include groups 7, 9 and 11, ending on the top of group 11 with A2.

The second phase would start on group 2 at the top with B1. Proceed through three groups 2, 4 and 6, ending with a B2 on the bottom of group 6. The second parallel leg of phase B would be started on the bottom of group 8 with a B1 and proceed through groups 8, 10 and 12, ending on the top of group 12 with B2.

Thus with a top to top and bottom to bottom diagram, the connection can be broken up into any number of legs or parallel circuits by simply opening the jumpers at the right places, as in Fig. 13. The

ABP *Always meant a lot . . .*

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Member of The Associated Business Papers, Inc.

dotted line jumpers between groups 5 and 7, and 6 and 8, are cut open at the point marked with the cross in circle to form a two parallel connection; or on the bottom of group 5, an A2 would replace the number five. Likewise, on the bottom of group 7, an A1 would replace the number 5. Then in the B phase, a B2 would replace the number 6 on the bottom of group 6, while a B1 would be used at the bottom of group 8 to replace the number 6.

The foregoing indicates the mechanical check, and the information can be used to make an electrical check on any connected two-phase windings that has had the rotor removed. The electrical check requires direct current and a compass, as this check depends upon the magnetic polarity of each pole phase group in relation to adjacent groups.

To check a two phase winding electrically for correct magnetic polarity, each phase must be checked separately and with direct current. It is desirable to know which of the two d-c leads is the positive lead, but in all cases, the A1 and B1 leads of the winding must be considered the ingoing leads, and the same d-c lead must be used on both the A1 and B1 motor leads. In other words, the current must flow through both phases in the same direction for the d-c magnetic check.

W ith current flowing in one phase, as A1 to A2, a compass is held near the core at the center of a group of coils, preferably group No. 1 which can be located by tracing the lead wire. Mark this group with an "N" or "S," depending upon which end of the compass needle is nearest to the core iron. Also bear in mind that if the north end of the needle points to the core, that the magnetic polarity of that group is south. Mark it "S" with white chalk. Next, advance the compass to group 3 which should be north. There should be as many marked groups as there are poles and the groups should alternate "N" and "S."

Next, change the d-c test leads to the B-phase line leads B1 and B2, being careful to use the same d-c lead for the B1 leads as was used on the A1 lead. Also trace out the group connected to the B1 lead and note whether it is ahead, that is, clockwise or behind the first A-phase group. This is important, as it determines which side of the marked A-phase groups to hold the compass when checking the polarity of the B-phase groups.

Mark each B phase group using a different colored chalk, and remember the relation between needle and core polarity. Then if the winding has been connected correctly there should be as many pairs of groups of like polarity as there are poles in the winding. The first groups marked should all be ahead or back of the second groups, depending upon the order of starting the marking of the second phase.

The next article will present the 6-pole, 2-parallel, single-voltage connections and will describe the methods used to check three phase windings.

Proper Handling Of Refrigerants

(*Continued from page* 24)

Then, by closing valve No. 3 and opening valve No. 4, the refrigerant in the auxiliary drum will quickly flow to the equipment to be charged since it is under a deep vacuum. This method permits the service engineer to fill the auxiliary drum with an accurately measured quantity of refrigerant in pounds, and to then transfer this charge to the equipment to be charged.

A pressure vacuum gauge installed on the main body of the manifold is essential and enables the entire operation to be handled quickly and accurately.

For those shops that can afford it, there is now available on the market a very simple and compact charging unit. This new device eliminates the scales and, instead, uses an auxiliary cylinder mounted on a panel board. The cylinder has a gauge glass mounted on the side and connected at both the top and bottom of the auxiliary cylinder. With the gauge glass valves open, the level of the liquid refrigerant can always be seen. A calibrated scale mounted behind the gauge glass, reading in pounds of liquid for each inch along the gauge glass, provides a simple method of determining the amount of refrigerant added to or taken from the charging system.

A set of manifold valves attached to the bottom of the cylinder serves the same purpose, and is operated in the same manner, as described previously.

This improved type of charging board, possibly, could be constructed by the service engineer with the exercise of a little ingenuity. However, the board can be purchased ready for use at an approximate cost of $60 per unit. Of course, it is necessary in either case to have a separate unit for each type of refrigerant being dispensed.

The service engineer must realize that when he undertakes to charge his own service cylinders, he has assumed the responsibility of keeping them clean and free of moisture and dirt. In general, he will find that it is bad practice to remove or save refrigerant from equipment in use because the moisture and corrosion from one piece of equipment may be charged into the next job. In my opinion, the refrigerant taken from a job is not worth salvaging unless it may be that the refrigerant is removed from the system for repairs and then replaced.

In such instances, after the cylinder has been discharged, the service valve on the cylinder should be removed and washed out with carbon tetrachloride or some other good solvent cleaner. After replacing the service valve, the cylinder should be evacuated and baked out. It is also good practice to clean the cylinder periodically even though it is being charged only with new refrigerant.

Perhaps it should be pointed out here that errors made by service engineers in adding the wrong kind of refrigerant to a system may result in serious damage. In most instances, this error results from the fact that the engineer has not properly identified the refrigerant in the system or the service cylinder. Such errors can be prevented to some extent by keeping the cylinders clean and freshly painted according to a definite color scheme. The color scheme commonly used on refrigerant drums is as follows: aluminum color for freon, yellow for methyl chloride, and black for sulphur dioxide.

Another point to remember is that if a cylinder is never discharged completely while on the job, it is possible to distinguish the gas with which it has been charged by the odor. Such practice also results in additional safety since air or moisture will not be taken in through the valve if there is a slight pressure resulting from a small amount of refrigerant left in the cylinder. Always keep the drum connections plugged when not in use.

Experience with Shunt Capacitors

(*Continued from page* 20)

4160 volt rural feeder. This particular pole lead was jointly occupied by power facilities and open wire telephone circuits of the telephone company. Complete data were not secured in this case. The capacitors were disconnected pending a general rearrangement of both power and telephone facilities previously scheduled in connection with a highway construction project. It is not unlikely that this case will require further consideration.

The third specific complaint involved a parallel at narrow alley separation of a 2.4 kv primary lead and an open wire telephone toll lead in a town of 9500 population. A delta connected capacitor of 45 kva was contributing slightly to the noise, the major portion being produced by poor current wave form taken by an elevator motor served through the same exposure. This case is only mentioned in order to describe the method of correction applied, which could also have been used had the capacitors been the major contributing factor.

The primary wires occupied three pin positions on a standard six-pin cross arm. Referring to the pin position nearest the telephone lead as No. 6, the pin positions occupied were 1, 2, and 6. Calculation indicated that relocation of the conductor in pin position 6 to pin position 3 would produce a reduction of approximately 75% in the interference in this case, a reduction that would be sufficient. The rearrangement was made and subsequent tests corroborated the calculations.

Fourth Complaint Studied

The fourth specific inductive interference complaint involved 225 kva of wye connected capacitors on three-phase, four-wire, multigrounded neutral 4.16 kv city distribution feeders. These power facilities were principally on joint use poles, with local telephone circuits in cable. The increase in noise in the party line telephones from all other causes amounted to 15 db, with a maximum value of 24 db. The remedial measures selected to reduce the noise were: (1) replacement of low impedance telephone ringers with high impedance ringers; and (2) replacement of the wye

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connected capacitors with delta connected capacitors.

Tests indicate that when these remedial measures are completed, the noise in the party line telephones will be well below the value that results in transmission impairment.

In view of the fact that capacitors are installed on seventy-nine circuits and only the foregoing four cases have required investigation and corrective action over a period of three years, it has not been considered necessary to formulate general methods for minimizing the interfering effect of capacitors.

Understanding and Using The National Code

(*Continued from page* 17)

feet has its load calculations based on the other demand factors shown in Table 17, Column D.

For example, a single family dwelling having 4000 square feet would require a minimum feeder load of 2000 sq. ft x 1 watt per sq. ft. x 100% demand factor = 2000 watts; plus 2000 sq. ft. x 1 watt per sq. ft. x 60% demand factor = 1200 watts; or a total of 3200 watts.

A ten apartment dwelling with 500 square feet per apartment would require a minimum main feeder load of 2000 sq. ft. x 1 watt per sq. ft. x 100% demand factor = 2000 watts; plus (10 x 500—2000) x 1 watt per sq. ft. x 70% demand factor = 2100 watts; or a total of 4100 watts.

To the 1008 watts of feeder load calculated for the residence shown in Figure 14 there must be added, according to Table 18A, 1000 watts minimum for small appliance load. The total calculated minimum feeder load for this dwelling would be 2008 watts. On the basis of a two-wire, 120-volt feeder, the minimum feeder size which may be used must carry 2008/120 = 17 amperes. Therefore, a two-wire, No. 12 feeder must be used.

The main feeder for the 10 apartment residential dwelling must carry, in addition to the 4100 watts of lighting load, the minimum small appliance load as set up in Table 18A. As was previously pointed out, this table is based on actual operating experiences which show that the main feeder supplying all ten of these apartments would not have the maximum load of each apartment occurring at the same time. For this reason, a demand factor is applied to the calculations depending on the total number of apartments. The table shows a demand factor of 70% for a 10 apartment house or smaller.

The main feeders, therefore, will have to carry in addition to the minimum lighting load a minimum small appliance load equal to 10 x 1000 watts x 70% demand factor = 7000 watts. Therefore, the main feeders must carry a minimum of 11,100 watts. A three-wire 115/230 volt feeder must have a minimum size capable of carrying 11,100/230 = 48 amperes. A three-wire, No. 6 feeder would serve for the main feeder for this apartment house.

Table 18B establishes demand factors for the range load installed on a feeder. In using this table, it must be noted that it only applies when the individual ranges are rated at more than 1650 watts. Thus, an apartment building having, for example, three subfeeders with thirty 1000-watt cooking appliances connected to each feeder must have the feeder load calculated on the basis of 30 x 1000 watts for each feeder and not on the basis of applying the demand factor of 30% shown in Table 18B. However, if it is the definite knowledge of the wiring design engineer that a demand factor may be applicable, he may obtain from the inspection authority special written consent to use such a factor if he can satisfy the inspector that the conditions as he sees them will actually exist. This table was established after exhaustive tests were made throughout the country and represent average minimum conditions of all these tests.

Finally, any motor load which may be used will have to be added to the lighting and appliance feeder load. The calculation of this feeder load is completely outlined in the motor section of the code, Article 430. In general, however, this calculation is quite simple. Taking a load, as an example, consisting of four three-phase, 220-volt motors: one 10 hp, one 5 hp, one 3 hp and one 2 hp, it is found that the full load running current of these motors (See Table 14, page 276 of the Code) is 27, 15, 9 and 6 amperes, respectively. The feeder must be large enough to carry the full load running current of the motors plus an additional current equal to 25% of the

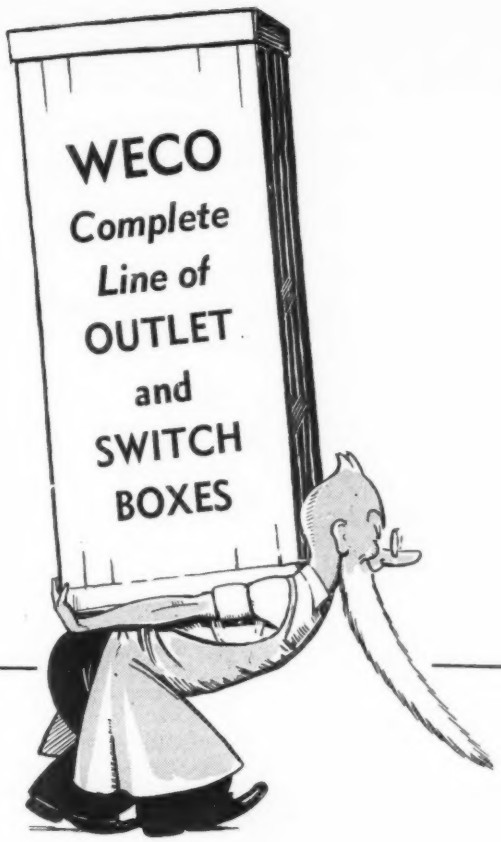
full load running current of the largest motor in the group. The feeder load, therefore, for these four motors is equal to 27 + (1/4 x 27) + 15 + 9 + 6 amperes or 64 amperes. These calculations will be explained further in a subsequent discussion on Article 430.

The Electrical Committee's Article 220 Committee Reports recommend that the 1000 watts minimum feeder load for small appliances in single family dwelling be raised to 2000 watts. Actual experience has shown, in general, that more small appliances are in use in single family dwellings than are used in the other type of residential occupancies. In a measure, this is a result of the generally higher economic status of the single family dwelling residents.

Section 2203 recognizes some exceptions to the general feeder load calculations rules as applied to the neutral feeder load. Figure 18 illustrates a simple feeder circuit for a lighting load on either a four wire or three wire system. In either case, under the loading conditions shown, the maximum unbalance current which would flow in the neutral due to a fuse blowing in any feeder phase line would be 300 amperes.

In Figure 19 various 220-volt motor and appliance loads have been added to the feeders. The current in the feeders has been increased. However, if any of the fuses blew on these systems, the maximum unbalanced load on the neutral would still be 300 amperes.

The feeder calculations obtain the load which may be expected to be imposed on a system based on the minimum factors set up in the code. As the load is increased on a feeder system, the possibilities of using this entire load at the same time is decreased. The code recognizes that on a large feeder system it is quite possible that all the load may not be used simultaneously so that the actual maximum unbalanced current may be less than calculated. The code, therefore, allows the use of a 70% demand factor on that portion of the neutral feeder load above 200 amperes. For the cases shown in Figures 18 and 19 the neutral feeder may be designed to carry the load as determined by the following calculations: 200 amperes x 100% demand factor = 200 amperes; plus (300—200 amperes) x 70% demand factor = 70 amperes; or a total neutral feeder load of 270 amperes. Instead of a 350



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MCM cable for the neutral, a 300 MCM cable may be installed.

Where these calculations are made for the main service entrance feeders, the size of the neutral feeder may be further reduced. For services only, an uninsulated neutral may be used. The use of a bare neutral, therefore, will allow a further reduction in wire size so that a 3/0 bare neutral may be used for minimum service feeders for the systems shown in Figures 18 and 19.

As has been continually pointed out in these discussions, the values obtained by these calculations are only minimum values. If a study of the final system shows that the actual maximum unbalance neutral current will exceed that obtained by applying the 70% demand factor to the excess over 200 amperes neutral current, then this actual current value must be used in designing the neutral feeder.

Section 2204 outlines the use of common neutral feeders. It will be noted that the requirements as set up by this section will not allow more than nine wires to be grouped together. This is very important as section 3467, in conjunction with Table 2, limits the number of wires in any one conduit to nine wires. Two 3-wire feeders with a common neutral makes up a group of five wires, three 3-wire feeders make up a group of seven wires, two 4-wire feeders also has seven wires, and two 5-wire feeders (two-phase) has the maximum number, nine wires in a group.

Furthermore, if the wiring is installed in conduit for an a-c system it is very important to have all the wires contained in the same enclosure. Section 3052 provides for this and a code revision has been recommended for Section 2204 wherein a cross reference will be written into this section, requiring the common neutral feeder system to be installed as outlined in section 3052.

The reason for this requirement has been fully covered by many commentaries on the code but it will bear repetition as a means of emphasizing its importance. Figure 20 shows two 3-wire single phase a-c circuits having a common neutral feeder. The two circuits are installed in two separate conduits with the common neutral installed in one conduit as shown. Feeder A has a balanced load of 200 amperes flowing through it, while Feeder B has an unbalanced load of 150 amperes on one phase wire and 50 amperes on the other. The neutral of feeder A will carry no current while that of feeder B will carry the 100 ampere unbalanced current. (Assuming 100% power factor conditions).

Looking at the wires in feeder pipe No. 1, we will note by inspection that the two phase wires are carrying 200 amperes each and the neutral, 100 amperes. The 200 ampere loads in each phase wire will neutralize each other since they are equal and flowing in opposite directions thus setting up opposite fields. However, the 100 amperes in the neutral does not have any counteracting field so that the lines of force set up by this a-c field induces a voltage in the enclosing conduit. This conduit now acts as a conductor, and the induced voltage causes a current to flow in it and thus heats it up. Similarly, in feeder pipe No. 2 one line has 150 amperes flowing in it and the other 50 amperes. Therefore, only 50 amperes of current is neutralized, leaving 100 amperes to set up an a-c field to induce current in feeder pipe No. 2 and thus causing it to become heated.

Section 2205 is being enforced to a great extent by many inspection authorities. These layouts are of considerable help to the inspectors in understanding a wiring system, and enable them to render a much more intelligent and accurate inspection service.

Holiday Lighting For Knoxville

(*Continued from page* 14)

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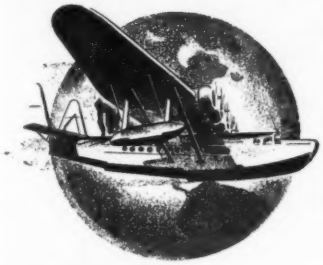

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(*Continued from page* 12)

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(*Continued from page* 10)

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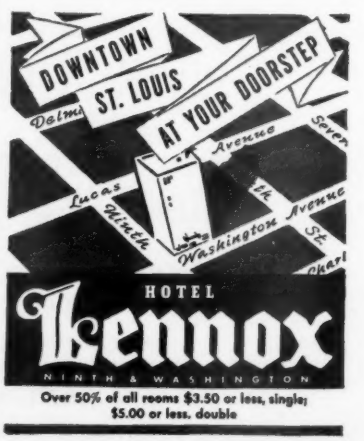
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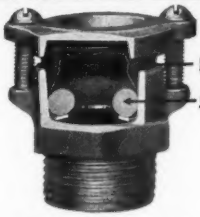

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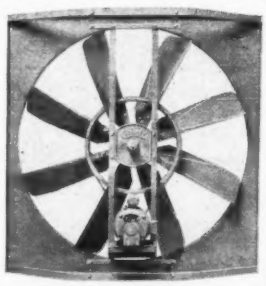

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Automatic Electric Mfg. Co., Mankato, Minn.

Millions of people still think that electricity is expensive. There are even many people in the electrical business who don't know any better. They have not stopped to ascertain the actual low cost of operating a 100 or 300-watt lamp. The cost bugaboo should not only be removed but at every opportunity emphasis should be placed on the extremely low cost at which eye comfort and safety can be obtained.

Certainly, it is ridiculous when we consider how easily and thoughtlessly a prospect may spend a nickel for a soft drink but strenuously object to using a 300-watt I.E.S. lamp which can be operated eight or ten hours for that same nickel. The soft drink gives momentary pleasure and satisfaction to but one person, but the lighting nickel gives comfort and happiness for hours to every person in the family. The amazingly low cost of operation is a very definite merchandising asset. Every sales person should be familiar with local electric rates as applied to various wattages used in I.E.S. lamps and have ready comparisons to cigarettes, chewing gum and similar universally used items.

I.E.S. lamps offer opportunities both from the standpoint of market and selling arguments that few electrical products possess. To sell them like ordinary lamps are sold will not build sales. Their design, history, application, acceptance, performance and the splendid promotion back of them are all assets that create interest and clinch sales.

It is not alone the fine cooperation of the manufacturers that has put the I.E.S. lamp on the map but the proper product for a definite and urgent need. That made the entire program click. The I.E.S. tag, inspection and other features of the program have been emulated by other industries with indifferent success but the soundness and sincerity of purpose of the program has spelled continued success for I.E.S. lamps since their development six years ago. Utilization of their selling assets will mean profits to merchandisers as well as satisfaction of a service rendered to humanity.

Twelve-Month Plan Builds Washer Volume

(*Continued from page* 9)

ber of men who do an excellent job in demonstrating washers. But there are only two who would as soon demonstrate an ironer as a radio, and they are responsible for a good share of our ironer volume, in one of the biggest retail outlets in our organization.

So we cannot credit the increase in ironer demand to activity of salesmen in that field. More likely, we believe, general increases in advertising has resulted in more women being ironer conscious, while more women are learning to use this appliance.

Another indication of better business generally throughout our territory is a rather sharp increase, over last year, in the number of cash sales of major laundry appliances. It has not been a development that would cause us to make charts and graphs and call it a trend. But it has been marked enough to attract our attention, as is the tendency for purchasers to make more substantial down payments on installment contracts.

Finally, we find it essential in the sale of major laundry appliances to maintain and increase volume, for this maintains our buying power, and we find buying power of basic importance in producing profit items. But with 39 stores and 43 associate dealers in four or parts of four states—Oklahoma, Kansas, Missouri and Arkansas—our buying power is something of a fixed asset.

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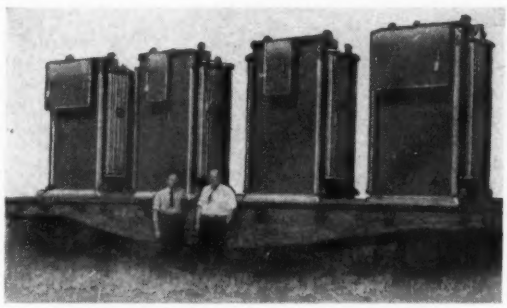

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Youngstown Sheet & Tube Co. Inside Front Cover

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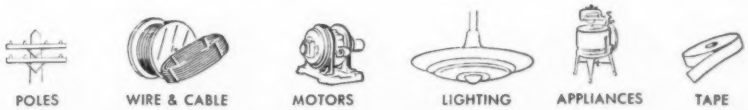

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